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Improved Steam Oven.

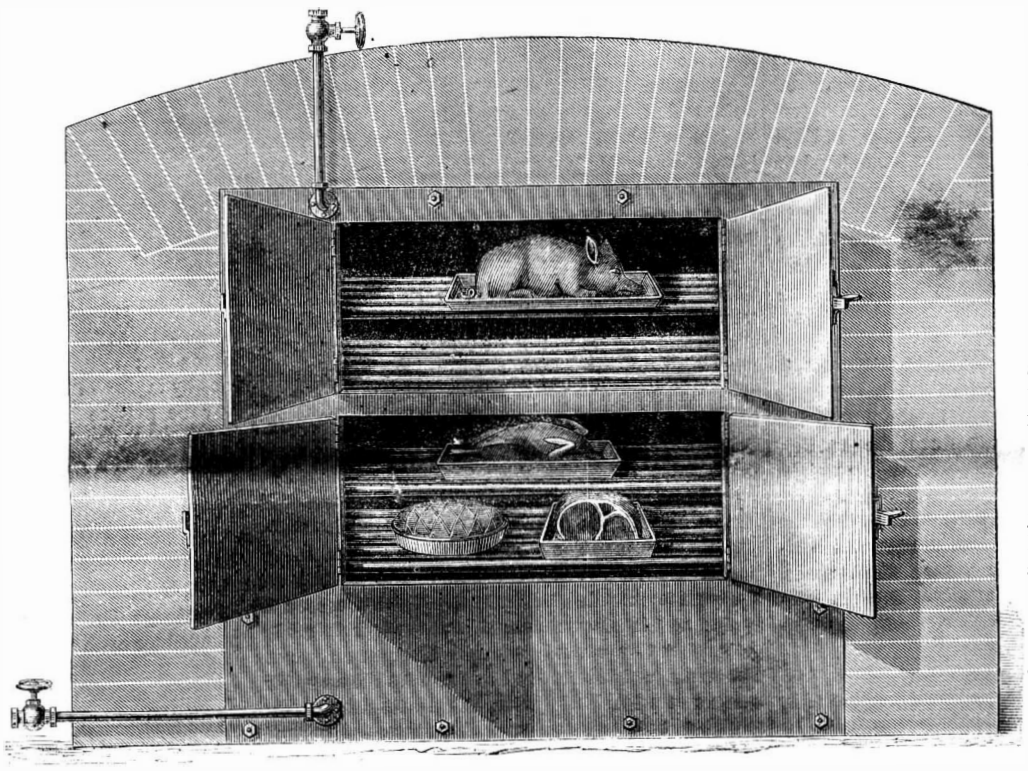
All housekeepers and cooks know that it is difficult to regulate the heat of ovens when coal or wood is used, and that great care is necessary to prevent the food from burning. In this engraving a steam oven is illustrated—one wherein the heat is furnished by steam at a moderate pressure, no fire being used in connection with the oven itself. Steam at 35 and 40 pounds pressure has a temperature of 280° and 290°, which is sufficient for all culinary purposes.

The details are as follows:—A brick arch is built to receive the steam pipes of any capacity required. A close coil of pipes is laid at the bottom, and an open coil over it and connected with it which fills the oven. The pipes of the open coil are the shelves on which are placed the articles to be baked, as shown in the engraving. The interior is lined with tin which, at the top and ends, has a space between it and the wall of about three inches, and does not extend quite to the bottom of the oven. At the top it is perforated with holes, letting the heated air pass above it, and in contact with the brick work. As it becomes cooled it descends along the sides, and passing below the lining into contact with the pipes again, rises, and thus establishes constant circulation of hot air. The front of the oven is constructed of tank iron with doors, and is secured to the brick work by anchor bolts laid in for the purpose. It is so made for convenience of building and repairing the coil. The steam enters the coil at the top and passes out at the bottom, to the trap, or onward to do other work.

A small upright boiler and engine, to do the work, and one of these ovens attached, would make a portable bakery of great value in all cities.

One of these ovens, two feet by six feet base, and five and a half feet high, may be seen in operation, capable of baking for a thousand people, at St. Luke's Hospital, corner of 54th street and Fifth avenue.

It was patented through the Scientific American Patent Agency on Jan 23, 1866. Rights for sale on favorable terms. Address for further information J. G. Whitlock, No. 954 Sixth avenue, New York.



WHITLOCK'S STEAM OVEN.

DESCRIPTION OF THE SUSPENSION BRIDGE AT CINCINNATI.

In 1856, John A. Roebling, of Trenton, N. J., who contructed the Niagara suspension bridge and many smaller ones of similar character, made a contract to build a suspension bridge across the Ohio River, connecting the cities of Cincinnati and Covington, at an estimated cost of $1,750,000. The *Cincinnati Commercial* gives a complete and interesting account of the structure, from which we make some extracts:—

THE PIERS,

The foundation of the piers are of Indiana limestone, and the piers themselves are of sandstone. The dimensions at the base are eighty-six feet by fifty-two feet; at the top (two hundred feet above) seventy-four feet by forty feet. There are thirty-two thousand perches of masonry in this piece of stonework. About one hundred feet above the bottom of the foundation is the floor of the main archery, across which the floor of the main bridge will run. Here the tower has the form of an arch from seventy-five feet, from floor to keystone, and forty feet in the clear at the base.

THE ABUTMENTS AND ANCHORAGE.

Roadways of massive stonework, in the form of arches a portion of the way, lead from the first approaches to the bridge on either side—from Front street, in Cincinnati, and from Second street, in Covington. These abutments form the shore supports for the immense iron work of the links by which the cables are connected with the anchorage far beneath the ground surface, and below the shore ends of these abutments. There are in each of these abutments thirteen thousand perches of stone—twenty-six thousand in the total, which added to the sixty-four thousand in the piers or towers, give a grand total of ninety thousand perches of stone work in the bridge. From abutment to pier there is a distance of two hundred and eighty-one feet. From the beginning of the roadway on Front street, Cincinnati, and from Second street, Covington, there is, of course, a gradual ascent along the abutment and shore portion of the suspension to the pier, and then comes the slight descent and ascent produced by deflection of water suspension. Nearly fifty feet below the surface of the ground, under each side of both abutments, embedded in masonry, are the huge anchor plates—the primary supports of the bridge. These are large, square and flat cast iron plates into which the ends of the anchor bars are fastened, and they are covered with the masonry of the entire anchorage and abutments. These anchor bars are connecting pieces between the shoe, to which the end of the cable is fastened, and the anchor plates. There are between each shoe and plate eight or nine lengths of anchor bars, sixteen side by side in each length, and each bar or strip ten feet long, nine inches wide, and one and one-third inches thick. The reader may imagine the size and strength of the sockets and cross bars used in connecting these lengths with each other, and with the shoe of the cable and the anchor. And all this iron work is repeated four times, once on each end of each cable. The cost of the masonry is about forty per cent of the entire cost of the bridge.

THE CABLE.

The abutments on both sides are now covered and surrounded with workshops, wherein nearly two hundred men are employed in forming the cables, finishing the iron work, and getting out the wood work for the bridge. There are but two cables, one on each side, running over a saddle on the top of both towers and ending in a shoe on each side. The work of making the cable is all done in temporary workshops on and about the anchorage of the Cincinnati side. In the yards around may be seen hundreds of coils of wire all from the manufactory of Johnson & Nephew, Manchester, Eng. This wire is No. 9, and is one-eighth of an inch in diameter. In each of these hundreds of coils there are from twelve to sixteen thousand of feet. Every inch of wire receives three coats of linseed oil before it enters the wire shop where the wire is spliced. In splicing it is filed, nicked, and wrapper with fine wire. In this shop there are a score of large drums, upon which the wire is coiled after being spliced.

Near the end of the abutment are wheels, receiving power from an engine below, by which an endless wire rope, an inch in diameter, is made to move in a complete circuit the entire length of the bridge, from shore to shore, on both sides. With this rope move the traveling wheels, one on each side—one going over with its load of wire while the other returns empty—the machinery being reversible, of course.

The traveling wheel is a curiosity. Seen from the shore or the river it looks much like a mammoth spider crawling along its web up to its den—the webs being aptly represented by the confusion (apparent) of wire supporting the temporary foot bridge, and the cable strands already completed. The traveling wheel, when it starts out from this side, is half encircled by one of these one-eighth inch wires—already secured to the shoe upon which the strand is being formed. As the wheel moves, revolving as the rope glides along, the lower wire remains stationary as it is laid along the strand, while the wheel, in paying out, pulls the upper portion along. The reader may illustrate this by taking a long piece of thread, tying the ends together to make it continuous, fastening the thread by a pin, at one end of the table, placing an empty spool within the circuit thus formed, throwing the thread over the spool and back

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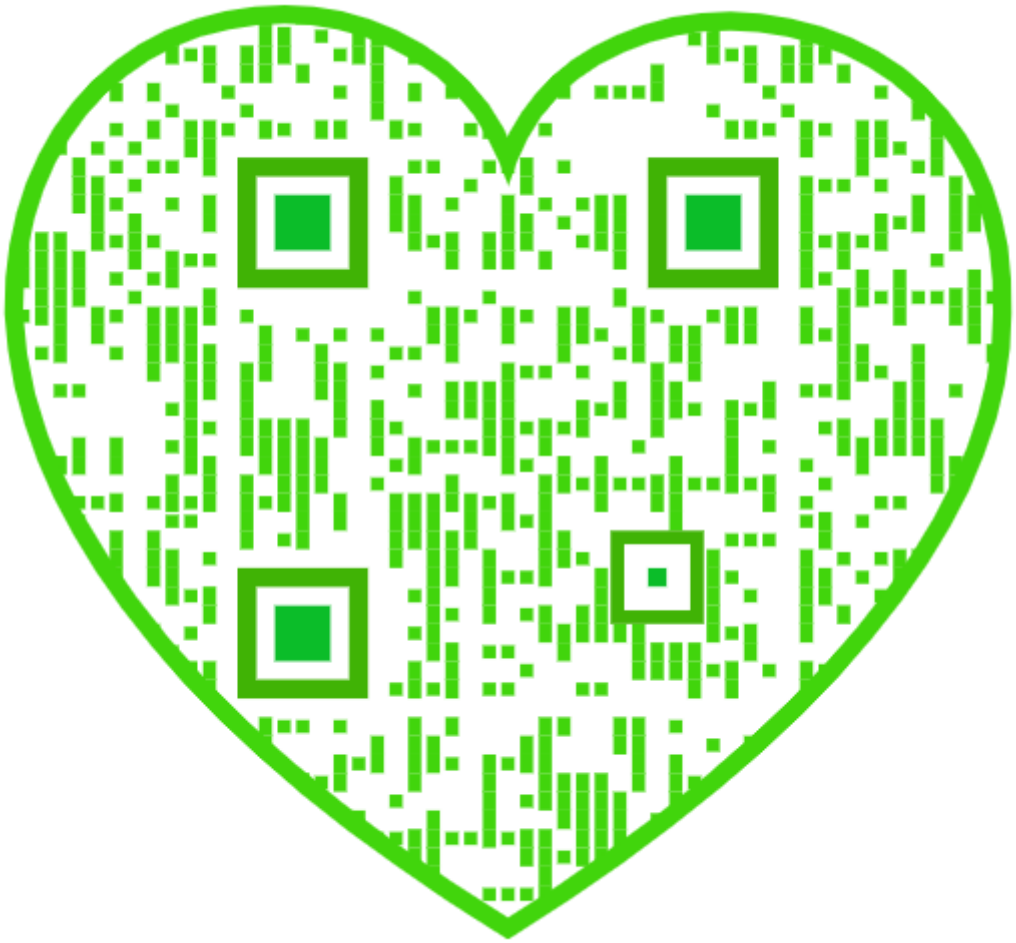

of the pin and then slowly rolling it along the table. Let the furthest end of the table represent the anchorage on the the other side, and another pin the other shore, and he will find, when the spool arrives at that end, that two lengths of thread have been laid. These traveling wheels cross every eight minutes, and lay five tuns of wire per day.

There are to be but two cables to this bridge, one on each side. Each cable is to be composed of seven strands, and each strand of seven hundred and forty of these one-eighth inch wires. Every strand is laid from shore to shore, fastened in its own shoes, one on each side, and each shoe is then sunk into its bed or socket, and thus firmly connected with the anchorage. The traveling wheels having laid these seven hundred and forty wires on each side, and all of these having been secured, they are bound about the entire length with wires, at intervals of nine inches. The men who do this work travel along the strand on a sliding platform from shore to shore, forcing the wires together tightly in a round shape, by means of powerful leverage, and then binding. Then follow the men with oil and paint.

ADJUSTING THE SHOES.

The strand having been thus completed, the shoes are let forward to their sockets in the anchorage connections, and the strand thus allowed to slowly fall to its place from shore to pier, from pier to pier across the river, and then again from pier to shore. In doing this, tremendously powerful tackle is brought into use on both sides—ropes of iron one and a half inches thick, any number of them, and a system of blocks and pulleys of heavy iron, done up in huge proportions. Four strands have been completed on either side—eight in all.

Each cable will be twelve and a half inches in diameter, composed of seven strands, each strand of seven hundred and forty wires, each individual wire having a strength of one thousand seven hundred pounds.

THE SADDLES.

The piers or towers hold these cables at the requisite altitude, with their massive heads. On the tops of these towers, embedded in the rocks, are plates of cast iron, on which are fixed the saddles, two on each one for each cable. The saddle weighs 14,000 and the plates 17,000 pounds. Through a groove of the saddle runs the cable, and between the saddle and its plate are small iron rollers which allow of the moving of the plate a very slight space, in case of an extraordinary necessity. These saddles are to be covered with the thirty feet high ornamental turrets before mentioned.

THE SUSPENDERS.

Around a model of the cable, or a section of it, may be noticed an iron strap, four inches wide by one-half inch thick. Attached to this, where it is brought together, is a conical socket into which the end of the suspender is to be fastened by being spread and covered with lead. The suspender is a wire rope one and one-eighth inches thick, by which the bridgeway is connected with the cable and suspended therefrom. Every five feet, on each side, there is to be one of these powerful suspenders. In the very middle of the bridge, solid one and three-quarter-inch iron rods will take the place of the wire ropes. When the strands shall have been all finished they will be brought together, seven on each side, to form the cables; the straps will be shrunk on, red hot, and the suspender connections made. There will be six hundred and forty-eight of these straps, sockets and suspenders in the structure. The suspenders and connections are made at the Wire Works of Mr. Roebling, Trenton, New Jersey.

THE BRIDGEWAY.

The construction of this portion of the improvement will be but a trifle in comparison with the stone and wire work. The total length including approaches from Front street, Cincinnati, and Second street, Covington, will be 2,252 feet; length of main span from center to center of towers, 1,057 feet; to each land suspension, 281 feet; width of bridge in the clear, 36 feet; hight above low water, 100 feet; (and here the reader will have recalled to recollection the fight in the Legislature and Council, three or four years since, over the proposition by the company to have this reduced from one hundred and twenty to one hundred feet, and in which the company was finally successful, notwithstanding the immense opposition.) There will be five hundred thousand feet of lumber in the bridgeway, all of which will be thoroughly soaked in tar in tanks on the Covington side, where the planing mill is located. The wrought-iron floor beams, the length of two of which makes the width of the bridge, are nineteen feet by five inches, and there will be two joined in one, in every five feet of the bridge—one to each suspender. The weight is twenty pounds per foot. These were made at the Buffalo Union Iron Works. Two iron trusses, ten feet high, will separate the foot roadways, one on each side, from the carriage ways; and flat-iron tracks, of accommodating width, will be laid for wheels to run upon. The wrought-iron girders, thirty feet long and twelve inches wide, will run the entire length, under the middle of the bridge. Ornamental iron railings will protect the foot passages on either side

NEW INVENTIONS.

Oyster Cracker.—This invention relates to an ingenious implement, especially intended for the cracking or breaking of oysters and other shell fish, etc.—although it can be applied to the cracking of nuts,—whereby the oysters can be cracked and opened in much less time than with the knife now commonly used for such purposes, and without the least spattering of the mud over the clothes or about the room. This implement consists of a fixed and a movable jaw, the latter being arranged and operated through the means of a lever handle, in such a manner, that, if the end of the oyster which is to be cracked or broken or a nut, be first placed between the two jaws, the movable jaw can be brought down upon the oyster or nut, as the case may be, with sufficient pressure to break or crack it, as desired. W. P. Lyon, Portchester, N. Y., is the inventor.

Axle Box Cover.—Hundreds of tuns of covers are annually lost on the railroads of this country, oil wasted, and brasses worn out, from the lack of a simple and economical means of adjustment. The first cost of an ordinary axle box is greatly enhanced by the labor required to produce a perfect joint between the cover and the outer surface of the box. The box is necessarily ridged along the parting from the variable manner in which flasks unite. The peculiarity of this invention is the use of an over flanged cover, fitting against a seat on the inner surface of the box. The core of the box after being pasted together, is blackwashed and smoothed on the surface intended for the seat. By this means a perfect seat is always insured, and the box is ready to be placed on an axle without filing or chipping. The cover, which is entered and removed in a similar manner to a hand-hold plate, has cast in its center a standing bolt, square for a short distance, beyond which a thread is cut to the end of the bolt. Over the square part of the bolt fits a cast iron bridge, and on the thread a bulb-handled nut. When both of these are in place, the point is burred, thus preventing the possibility of loss. The bulb handle counteracts any tendency to rotation by its weight. Even if rotation were possible, the cover could in no case be lost; it would always drop inside of the box. No wrench is required when oiling, or renewal of brass are necessary. The saving in first cost of a cover fitted on this plan over the ordinary arrangement of two bolts and lugs is more than one-half. The box is in successful operation on different roads. William S. Auchincloss, New York City, is the inventor.

Purifying Animal Coal.—In refining sugar, where animal coal or bone-black is used in the process, it is customary after the sirup or liquor has been filtered through the mass of coal, to reburn the coal in order to destroy the impurities collected in it from the liquor, and thus prepare it for being used again for filtering. But before the said coal can be used again, the dust and impurities found therein, and such as are produced in the process of combustion, should be removed, because if they are allowed to remain great danger results to the sugar. The devices and means used hitherto for removing the dust and other impurities from animal coal have not been inefficient because they have not sufficed to remove the impurities and foreign substances therein after reburning. This invention consists in a novel construction of apparatus for treating the reburnt coal by the use of which dust and other impurities are efficiently removed, and the same collected in a receiver so as not to be allowed to float through the atmosphere. Heretofore great complaints have been made by families residing in the vicinity of sugar refineries against the clouds of dust which often fill the air and settle upon the grounds and upon articles exposed in the air, thereby inflicting much loss and inconvenience upon laundresses and others. These complaints have threatened to effect the removal of sugar refineries from inhabited to uninhabited places, and their removal to such places would result in increased cost of carriage and labor, and in diminishing facilities for business. This invention does away with these complaints by removing their cause. Thomas H. Quick, 118 King street, New York City, is the inventor.

Button.—This invention consists in the arrangement of a pointed stud with a suitable shaped or curved groove, in combination with a pin or key projecting from the inner surface of the hollow shank of a button, with a suitable spring secured to the exterior or interior of said shank or to the exterior of a pointed stud, in such a manner that by means of the pointed stud the material to which the button is to be attached can be readily pierced, and by introducing said stud into the shank, and slightly turning it, the key is made to catch in the recess of the groove in the stud, and the button is securely held; by a slight compression of the spring the stud can be released and the button detached whenever it may be desirable. John M. Johnson, New York City (Box 4, Station F), is the inventor, and the patent was issued April 17, 1866.

Pantograph Machine.—This invention relates to pantographic engraving machines, and consists in certain novel devices and combinations whereby the machine is made capable of producing copies of the same size as the pattern; also of producing copies either smaller or larger than the pattern, but preserving the relative proportions; also of producing copies with any selected part of the outlines out of proportion; also of producing a series of parallel lines by means of a ruler which is made to advance over the pattern by the action of a pawl and ratchet. One of said novel devices is a transparent tracer, consisting of a glass with a dot on its surface, to be used instead of a metallic tracer. One advantage of such a tracer is seen in tracing from a paper sketch where a metallic tracer will obscure a portion of the line to be followed. Edmund Oldham, Brooklyn, N. Y., is the inventor.

Discharge Spout for Bottles, etc.—This device is intended for application to all kinds of apothecaries' bottles, graduates, etc., also to many household articles, such as cans, jugs, measures, etc. One of its ends is to be inserted in the head of the bottle, and this is the receiving end; the other is the discharging end, and it is tapered off so as to form a spout that will conduct the liquid from the bottle without any liability of the same being spilled. As further security against the above contingency, the spout is encircled with a continuous inclined trough arranged so that it will conduct back into the bottle any liquid which might run over upon the outside of the spout. A cap may be used for closing the spout, and in such case no other corking or stopping of the bottle will be necessary. Dr. L. B. Myers, of Elmore, Ohio, is the inventor, and the patent was issued on April 3, 1866.

Portable Fence.—This invention relates to a novel construction of a fence, especially intended for farm and garden uses, and it consists in constructing the fence in separate sections or parts in such a manner, and in so connecting them together, or to suitable posts, that the fence will accommodate or in other words, adjust itself to any irregularities in the surface of the ground which is to be fenced in by it, that is, whether more or less inclined or hilly; the peculiar manner of hanging or connecting the several sections of the fence to the posts, enabling them to turn or set at any desired angle or direction with regard to each other, according to the necessities or circumstances of the case. John Thompson, Williamsburgh, N. Y., is the inventor.

Machinery for the Treatment of Ores.—In this machine the ore is passed in through a constantly descending and continuous series of operations whose object is to pulverize and desulphurize the ores and thus extract the precious metal by amalgamation, by means of the fumes of mercury, and me-

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chanical trituration. The successive devices consist of a stamping mill, a series of crushing rollers; a roasting furnace in which the ores are treated with alkali, a cold water tank, an amalgamator, an arastra and a second amalgamator. The fumes are condensed in a chamber and the water supply for that and other parts of the apparatus is derived from elevated tanks. For rights in said patent address the inventor, John A. Hitchings, 99 Bond street, Cleveland, Ohio.

A New Photographic Washing Apparatus.

The importance of having photographic prints thoroughly washed can never be too strongly insisted on. A breach of this duty proves disastrous not only to the permanency of the picture, but in many cases to the reputation of the photographer, and incidentally to our art-science itself. So much does it effect the photographer that it would not be difficult to point out instances in which once flourishing businesses have dwindled down to a serious extent through the bad reputation attached to the permanency of the prints issued. There are, indeed, few possessors of well-stocked albums who are not alive to this fact, that the otherwise high reputation attached to the name on the back of a photograph does not necessarily afford a proof that his photograph will resist the ravages of time for even a very limited number of years.

The majority of cases of photographic fading may be traced to the hyposulphite of soda, which, by so intimately associating itself with the fibers of the paper, is difficult of removal, and which, if not perfectly removed, induces an action by virtue of which the print eventually becomes destroyed. To remove the hyposulphite of soda in the most perfect manner, and in the shortest time possible, is to insure to photographs a longer tenure of existence than they otherwise would have held; and any means by which these requirements can be met, are entitled to the greatest consideration.

Availing ourselves of an invitation from Colonel Stuart Wortley to visit Rosslyn House, to see a new form of washing apparatus, we went and saw it in action. It proved to be an instrument invented and patented by Mr. John E. Grisdale.

Before entering upon a minute description of this washing machine, we may state that it is capable of washing a full charge of prints in twenty minutes, and that so perfectly that at the end of this time some ordinary tests for hyposulphite of soda fail to indicate its presence. But we shall allow its inventor to describe the washing apparatus in his own language. "My invention," he says, "relates to a peculiar construction and arrangement of centrifugal machinery or apparatus for washing photographic prints, and consists, according to one arrangement, in the employment of a peculiarly-constructed revolving drum in combination with a trough, in which such drum is partially immersed. The prints to be washed are taken from the water in which they have been placed on their removal from the fixing or other bath, and are packed in one or more piles, which piles are placed round the circumference of the drum, each pile being composed of alternate prints and sheets of wire gauze or other open or reticulated fabric, so that no two prints shall be in contact with each other. These piles are held in their places on the drum by means of open frames or gratings, which bear against the opposite surfaces of each pile, and are secured to the arms of the drum by screws or otherwise, the whole or a portion of such frames or gratings forming part of the drum itself. Or, according to another arrangement, the piles above described may be laid flat upon a disk, which is made to revolve either vertically or horizontally in a trough or cistern, provision being made in the horizontal arrangement for allowing the piles to be brought in or out of contact with the water as required; or in lieu of the photographic prints being disposed in the form of piles or packs round a drum or revolving disk, they may be laid separately and individually round the surface of a drum, a webbing of open or reticulated fabric being wound on such drum simultaneously with the placing of the prints thereon, so as to interpose a thickness of the fabric between each succeeding layer of prints. The process of washing consists in alternately driving out the moisture from the prints by the centrifugal action of the revolving drum or disk, and saturating the prints again. During the first part of the process, the prints are not immersed, but when the second part of the process, namely, the saturation, is to be effected, the trough or cistern is to be supplied with water, or the prints may be brought down into the water, and caused to revolve therein and thoroughly saturated, when the water may be run off from the trough again, or the drum or disk elevated, and the moisture expelled by centrifugal force as before."

The instrument is neat and compact, and immediately strikes any intelligent observer by the efficiency of its action; for, by an amount of manual labor capable of being performed by a child, the drum is rotated with extreme rapidity, and the freshly-supplied water is forced through every pore of the prints, the consequence being the elimination of every trace of hyposulphite of soda in a very brief space of time.—*British Journal of Photography.*

HOW TO MAKE COFFEE.

BY PROFESSOR CHARLES A. SEELY.

In the capacity of *paterfamilias* and chemist I have made occasional descents into the kitchen, and so have become interested and somewhat skilled in affairs which to most men are profound mysteries. These visits have been profitable, for in consequence of them practical changes have been brought about, which, in the course of a year, will effect the saving of a handsome amount in time and money, and, what is of more consequence, they have furnished material for serious reflection. The preparation of food, though one of the most ancient of the useful arts, and perhaps the art of arts, as Prof. Blot would have it, is yet very far from being perfected. It is only in the nineteenth century that science and inventive genius have been zealously employed for its improvement; with what effect they have been so employed almost any person who can look back from the shady side of forty can tell. What changes in forty years! The dear old chimney corner, the pot hooks, the bake kettle, the brick oven, the Yankee baker exist only among the fairy remembrances of childhood. What will come in the next forty years! But I reluctantly dismiss these thoughts to fulfill the promise which the title of this article indicates.

The virtue of coffee consists in its volatile aroma and its fixed extractive matter. The happy combination of these with hot water is the problem for the coffee maker. This happy combination, in my opinion, when realized in perfection, implies that all the aroma and all the extractive matter of the ground coffee be got into the hot water, and retained there. It seems to me that no argument is required to show that any aroma which escapes into the air, or any extractive matter left in the grounds is so much virtue wasted. Now, to get at the same time the whole of these constituents of coffee has seemed very difficult. If boiling water be filtered through ground coffee—this is the French plan—the aroma is promptly extracted, and very little else, for the fixed matter needs more coaxing. If the ground coffee be boiled a long time in water—the Turkish and more common American plan—the aroma escapes with the steam. The French waste the extractive matter; the Turks, the aroma. The plan which secures one of the ingredients allows the other to escape.

Baron Liebig has investigated this subject, and those who have read his interesting paper published in the Scientific American a short time since, will perceive that so far I have only repeated his ideas. He proposes to avoid the difficulties in the case in this way:—He boils three-fourths of the ground coffee, and thus secures all the extractive matter from that; the other fourth he adds after the boiling, and secures the aroma from that. I know that Liebig's coffee is excellent, for I have made it; but I respectfully submit that it is not the perfect coffee, it is not the happy combination, which we are seeking for. Liebig loses aroma from three-fourths of his coffee, and extractive matter from one-fourth.

I now propose a plan which on reflection and after a considerable experience I find to be nearer perfection. My coffee making is a continuous process, and may be carried on for a life time. It takes two days to get well started, but after that there is a daily routine. To begin, I take rather more than the usual amount of coffee, and pour on it hot water when it is ready to be used; in other words, I make French coffee. The grounds from this operation I leave to soak in the pot till the next day, when I begin coffee making by pouring hot water on these grounds, which hot water I use according to the French plan in making coffee from fresh ground coffee. The process is now in full operation, and every time coffee is wanted the manipulations of the second morning are repeated. I thus extract all the soluble and useful matter of roasted coffee, and waste nothing.

To put the art in the most practical form, I have found it necessary to modify the coffee pot. Perhaps the simplest apparatus is the most ordinary pot provided with two strainers. The strainers are of cup form, and fit into each other and into the top of the pot. For use I set a strainer on the top of the pot, and into the strainer I place fresh ground coffee; over this I use the second strainer, containing the grounds of the last operation. Now hot water is poured into the upper strainer, and percolates down into the pot, carrying with it all the goodness remaining in the grounds, and the aroma and much of the extractive of the fresh ground coffee. When the water has passed down, I throw away the now useless contents of the upper strainer, and upset the contents of the lower strainer into the pot. Delicious coffee is now ready to be served to the appreciative household.

I have now unwittingly made this article so long that I am obliged to omit the scientific considerations and arguments, pro and con, which I have thought over for the occasion, and a discussion of the question from an economical point of view, wherein I was prepared to show the millions of dollars per annum that an adoption of my process might save to the world. I dismiss the subject with reluctance.

Note.—The above is the first of a series of articles which I propose to write for the Scientific American. The subjects of these will cover a very wide range, and in the end, perhaps, I shall have been in *rapport* with all classes of readers.

Preparing Casts for Electrotyping.

An excellent method has been published by Dr. Heeren, of Hanover, for preparing the conducting surfaces of casts, whether of gutta-percha, wax, or gypsum, from which electrotypes are to be taken. The surface is well moistened with a nearly concentrated solution of nitrate of silver in alcohol by means of a soft brush. An aqueous solution cannot be employed, because it does not readily moisten fine lines or narrow interstices, and easily runs together into little drops. When the entire surface has been wetted, the excess of the alcoholic solution is wiped away with a drier brush. The cast is now at once, before the silver liquid dries, exposed to the action of sulphureted hydrogen; if the object be small, it need merely be suspended for a few moments in a vessel filled with gas. If its dimensions, however, be so great that it cannot be readily moved, a stream of this gas should be made to play upon it from an india-rubber tube. The surface becomes covered with a thin film of sulphide of silver, the alcohol quickly evaporates, and in a few minutes the cast is dry and ready for immersion in the electrotyping bath. The sulphide of silver is an excellent conductor of electricity, being not inferior to graphite, and is therefore admirably fitted for this purpose; an alcoholic solution of acetate of copper can also be used, but the resulting sulphide does not conduct as well as that of silver. Various kinds of fruit, and the bodies of soft and delicate animals, can be easily electrotyped by this process.

A Great Meteor.—The most remarkable addition that has ever been made to the collection of meteorites in the British Museum accrued to it in the past year by the arrival from Melbourne of the great mass of meteoric iron found at Cranbourne, near that city, and known in the colony as the "Bruce Meteorite." It was purchased by Mr. Bruce, with a view to his presenting it to the British Museum. Through a misunderstanding the museum at Melbourne had a promise of half of it; the trustees of the British Museum, therefore, acquired and sent to the Melbourne Museum the mass of the meteorite iron, weighing 3,000 lbs., that was sent to the exhibition of 1862, and which had been found close to the great meteorite, and the latter was then forwarded entire to London. Its weight is rather more than 3½ tuns. It is, consequently, by far the largest meteoric mass of any collection in the world.

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Improved Slide Valve.

These engravings represent a new method of working the slide valve, as also a different plan of constructing it, whereby the ordinary steam chest is dispensed with, the steam being taken through a separate casting connected to the valve aforesaid.

Fig. 1 is a perspective and Fig. 2 a section through the valve. The valve is shown at A, and has hollow rods, B, at each end which enter stuffing boxes in the frame or casing, C. The valve is worked from the rods, D, which have a crosshead, E, on the front end. In the top of it there is a plug, F, Fig. 2, which werks freely in its place, but is kept steam tight by packing. This plug bears against two steel segments which, in turn, are received by the plate, G, in the top of the casing, C. The set screws, H, are merely to adjust the parts as they wear.

Fig. 1.

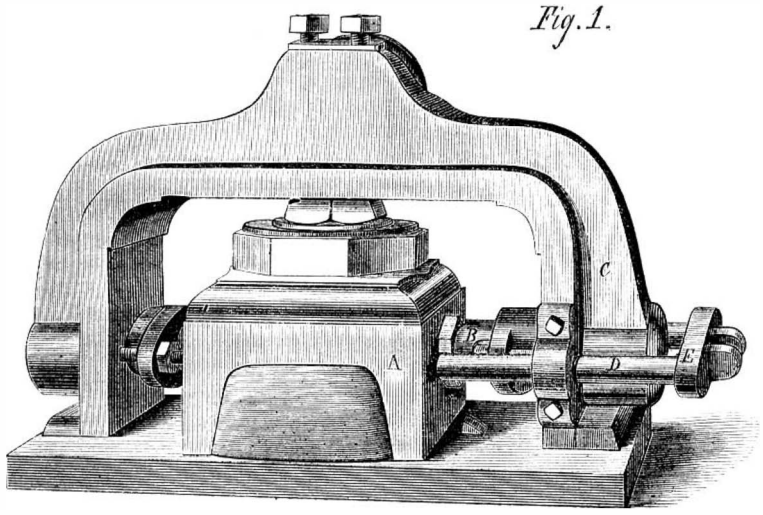
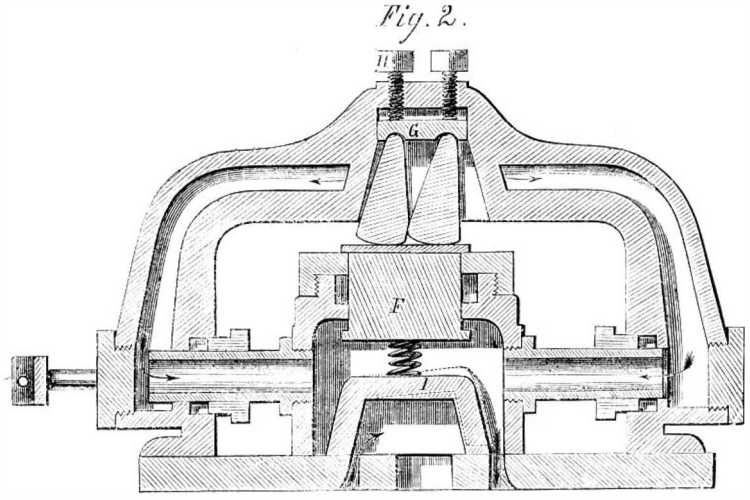


Fig. 2.



GREEN'S SLIDE VALVE.

When the steam enters the chest through the casing, C, it presses against the plug, F, and forces it up, which has the effect of equalizing the pressure on the valve, I, inside, so that the friction on the face is greatly reduced.

The central or inner valve, I, is capable of rising when the pressure in the cylinder is greater than that in the chest, which is the case when locomotives are reversed suddenly with the train going ahead. It can be seen at a glance whether this valve is working steam tight or not. It is easily adjusted and is not liable to get out of order. It is adapted to engines of all kinds.

For further information address the patentee, V. D. Green, of Watertown, Wis., by whom it was patented on Jan. 30, 1866.

Strikes.

The following is an account of the strikes that have been successful, according to report:—House carpenters, for $3 50 a day; bolt workers, against a reduction; plumbers, for $4 a day; fresco painters, for an increase of 50 cents a day; horseshoers, higher wages on various scales; pencil-case makers, higher wages; dock builders, for $3 and $4 a day.

There have been unsuccessful strikes, as follows: Painters, for eight hours; longshore ship painters for eight hours; horse collar makers, for higher wages; also harness makers, musicians, lightermen of Brooklyn; longshoremen of Brooklyn; Brooklyn house painters; carpenters and plasterers of Brooklyn; Brooklyn masons; Brooklyn quarrymen as laborers; Jersey City plasterers and bricklayers—all for higher wages; laborers in shipyards and ship painters, for eight hours; city railroad car drivers, for fifty cents a day; and hod carriers for higher wages. Some of the strikes were compromised or were partly successful, a few of the men receiving higher wages. Among them were the stone cutters, flaggers, tin and slate workers, stone masons, sash and blind makers, Brooklyn bricklayers and plumbers; quarrymen of New York, and mason laborers of Jersey City.

The unsettled strikes, beside those of the ship carpenters, caulkers, etc., are very few. Reductions in rates for labor have been made by a number of large establishments and companies. Among those are the Neptune Steamship Company and the Erie Railway Company.

A Reform Needed in the Patent Office.

The efficiency of that valuable branch of the Government, the Patent Office, is much lessened by the long delays which often intervene between the filing of an application and the final decision. We hope that if any amendment is made to the Patent Laws by this Congress, it will be aimed to cure this defect in the administration of the office, a defect which arises from an inadequate force, or else from a wrong classification of that force. There are now three classes of Examiners, called "Examiners," "First Assistants," and "Second Assistants." If there was but one class, and each had equal pay and an equal share of work, the accumulations would soon be got rid of, without the necessity of increasing the force. The present system compels an Examiner who has one or even two assistants, to go over the work again before a case is finally disposed of, and it seems to us, that if the assistants were made principals, and each had his separate and independent portfolio, the work would soon be brought up, and the examining corps might even be reduced in number, instead of being enlarged. While we are upon Patent Office matters, we owe it to the public and to inventors, to add our protest against the imposition of the ten dollars appeal tax. The patent fund is overflowing now, having about $150,000 surplus, and this comes wholly from the fees of inventors. What good will it do any one to make the inventors who have to appeal, pay an additional tax? Will that secure a more intelligent examination of their cases by the Examiners? This proposed tax is odious, and we hope Congress will refuse to pass it. On the other hand, we hope they will grant to those of the few Assistant Examiners who have, by the direction of the Commissioners, ever since the time of Judge Mason, been doing the work of full Examiners, the compensation allowed by law to Examiners who have independent charge of different classes of invention. Congress directed the Commissioner in 1856 and 1860 to pay such the legal compensation, and we believe that inventors would no longer have to wait six months or nine months for their turns, if Congress will break up the grades of Examiners altogether, and let each Examiner have his proper share of work and equal pay, and be able to dispose of applications with more promptness.—*New York Times.*

Experiments and Observations on Oxygen and Binoxide of Hydrogen.

Barium and manganese, which chemists agree in classing among the bodies improperly called *diatomic*, and which the author proposes to call *diplotypic*, present remarkable differences in their binoxides. Binoxide of manganese, for example, when treated with hydrochloric acid, gives chlorine, while binoxide of barium under the same circumstances gives binoxide of hydrogen,

Binoxide of hydrogen remains intact in the presence of binoxide of barium which served to produce it; but in the presence of binoxide of manganese it decomposes into oxygen and water, the binoxide of manganese undergoing no change.

The oxygen which peroxidizes the manganese decomposing the hydrochloric acid to take the place of the chlorine and form water, it is clear that the oxygen of the binoxide barium cannot do the same, at all events under ordinary circumstances. No chemist who has prepared binoxide of hydrogen by Thenard's process has obtained chlorine. It must be admitted, then, that chlorine has more affinity for hydrogen than for the oxygen which peroxidizes the barium, while the contrary is the case with the oxygen which peroxidizes the manganese. This is demonstrated by the following experiments:—

It we fill with chlorine gas a bottle into which a little water and some very finely powdered binoxide of barium has been introduced, a lively effervescence is seen when the mixture is shaken, the color of the chlorine dissappears, and in the end the bottle is found to be full of oxygen, which does not act on ozone paper.

The following experiments show still further differences between the binoxide of barium and that of manganese. We know that sulphovinic acid gives aldehyde when heated with binoxide of manganese. In the presence of binoxide of barium, however, sulphovinic acid gives ether and bicarbureted hydrogen mixed with oxygen and sulphurous acid, the reaction commencing at 103° and ending at 150°.

Pushing the analogies still further, the author has succeeded in preparing oxygenated water by means of peroxide of manganese. This water is destroyed by the simple presence of binoxide of barium, just as that obtained by the latter body is destroyed by binoxide of manganese, an experiment which clearly demonstrates the difference that exists between these two products. But the difference is rendered still more evident by the following fact: The oxygenated water obtained by means of binoxide of barium and that obtained by means of binoxide of magnanese destroy each other; the effervescence produced when they are mixed is not violent, but it is continuous, certain, and indubitable.

After referring to the physical investigations which the author intends to make, he states that oxygenated water prepared by means of binoxide of barium, when submitted to the action of four large Bunsen's elements, gives equal volumes of hydrogen and oxygen, even when far from being saturated, showing that the binoxide of hydrogen is decomposed in preference to the water.

Lastly, the author remarks that if oxygen presents two allotrophic states it is eminently probable that the bodies with which it unites may do the same; and hydrogen giving birth to two distinct binoxides, it is probable that it also may present itself in two distinct states, complimentary one to the other, in the two binoxides. Further, it seems probable that barium may present itself in one of these states and manganese in the other, which will account for the differences observed in their binoxides, and that the two bodies may be found in the opposite state to that in which we know them, and, indeed, that all elements may exhibit this sort of allotrophy.

Mr. Scott Russell, the eminent iron ship builder, of Cardiff, through untoward circumstances, has been compelled to hand over his extensive iron ship building establishment to his creditors, who intend carrying the works on under inspection.

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PRODUCTION OF ODORIFEROUS OILS.

[For the Scientific American.]

The production of odoriferous or essential oils from plants has been accomplished in a great variety of ways, more or less adapted to the especial kinds of oils which were to be obtained. The oldest known method is that of "pressure," which is appropriate, when the odoriferous oils are very abundant, as, for instance, in the peels of oranges, lemons, etc., the materials are placed in strong cloth, usually linen, and subjected to powerful pressure. For small quantities a common tincture press, used by druggists, is sufficient, while a large screw press is used for greater quantities. The expressed juice is allowed to rest, and afterward filter in order to separate the aqueous and slimy particles from the oil.

Another mode frequently employed is that of distillation, the most appropriate for the greater part of essential oils, although some blossoms, containing the most subtile and precious odor, cannot be treated in this manner.

Formerly flowers were distilled with alcohol, but this having a low boiling point, extracted but little of the valuable principles and was therefore properly replaced by water, while the former method is still in use for the production of liquors.

The plants are placed into glass or copper stills, upon a false perforated bottom placed a few inches above the real bottom, exposed to the fire. The vapors pass through a condenser into a florentine flask where the oils separate from the water.

This water always contains a small quantity of the oil in solution, beside some organic acids, as cinnamic, propionic, angelicic, are sometimes used in perfumery, but most generally for medicinal purposes, as for instance, aqua foeniculi, aqua menthæ piperitæ, aqua sambuci, etc.

The great amount of water used in this method causes considerable loss of essential oil, which is dissolved, and it was found necessary to remedy this evil. Among the many attempts to that effect those of Drew, Heywood and Barron deserve credit, who procured Letters Patent for their methods in England. They surround the still with a steam jacket, which is the source of heat, while by means of a stirring apparatus, they keep the material to be extracted in constant motion. They then place a quantity of water into the still sufficient to cover the plant used and the distillate passes through a condensing worm and collects in a vessel, where the oil separates from the water.

The latter runs into the funnel of a siphon tube, which carries it back into the still. As a matter of course, in the distillation of oil heavier than water, like that of cloves, the water is discharged from the top of the vessel, while in the case of the lighter essential oils it collects in the florentine flask.

The same water is used in this manner until the completion of the process, and being then a saturated aqueous solution of the oil it is more useful than otherwise, its small bulk not rendering its waste necessary.

In consequence of weight of water in the fresh plants, drying the materials before distillation produces a better qualitative result. Aromatic seeds, such as annis, etc., are best when soaked in warm water for a few hours before they are exposed to distillation. But they should never be pounded or bruised, as by so doing the oil globules are surrounded by the albumen of the seed, which, on coagulating by heat, prevents the evaporation of the oil. The oil being mainly in the crown hull of the seed is not affected by the albumen in its interior, when the seed was left entire. The same may be said of spearmint, peppermint, etc. The distilled oils are purified by re-distillation and separated from adhering water by means of a glass funnel with stopcock.

A third method used for the production of odoriferous oils is that of maceration. For this process the so-called simple pomade is prepared by mixing purified tallow and lard. This pomade is melted in a metal or porcelain pot, heated by a water or steam bath, and kept in this liquid condition for a period of 12 to 48 hours, during which time the flowers to be extracted are immersed in the molten fat which deprives them entirely of their odor. As soon as this is accomplished, the pomade is strained off from the extracted flowers and a new portion is macerated in the same pomade. This operation is repeated ten to fifteen times, until the pomade is strong enough. The so-called "huiles antiques" or ancient oils, are prepared in the same manner, pure olive oil being substituted for the fat. This method is chiefly used for the blossoms of roses, of oranges, and of the acacia, and sometimes for violets and reseda, although the latter are more generally treated by absorption. This method is chiefly used in France, the perfumery of which country has a very superior reputation. It preserves the natural aroma of the flower unchanged and in full strength, which cannot be done by the methods already described, where heat is made use of. For the purpose of absorption glass plates, from two to three feet square, are laid into appropriate frames about three inches high. They are then covered with an even layer of purified pomade, a quarter of an inch thick, into which the blossoms are planted, open portion turned upward as if growing in the natural state. They then remain from one to three days, the frames being set one above the other, and the flowers are removed and replaced by a fresh one. This process is repeated for two or three months. When oil is to be saturated with the aroma instead of the pomade, the latter is replaced by a linen cloth saturated with olive oil. This is spread upon similar frames, having a wire gauze bottom in place of the glass, the rest of the process being the same as that used for the pomade. The linen cloths saturated with the perfumed oils are then subjected to a screw press, where they are freed from the oil. All the methods described are more or less effective, but slow and tedious, and the endeavors to supplant them by others conforming more with the present state of chemistry, were crowned with success. Dr. Millon was the first who produced oil from the cereals, having their specific odors by treatment with ether. He afterward experimented in Africa upon tropical flowers with sulphide of carbon, chloroform, ether and methylic spirit, all of which readily dissolved the perfume of flowers, the ether and sulphide of carbon working most satisfactorily. The flowers are placed in a percolator and exposed to the ethereal solvent for about fifteen minutes. The liquid is then withdrawn and displaced by a new quantity of the same used for washing. This is left no longer in contact with the flowers than the first portion. The ether, charged with the entire perfume of the flower, leaves it behind after evaporation, in the shape of a slightly colored residue, which is generally oily, but soon becomes hard and waxy. This residue, exposed to the sun for some time, and occasionally moved about, loses the flavor of the solvent entirely, preserving the pure perfume of the flower. The greater part of the ethereal liquid is regained by distillation, and serves an endless number of extractions, it being always advisable to use the solvent of any perfume after regeneration to obtain the same perfume again. The regeneration of the ethereal liquid is accomplished a great deal quicker than the distillation referred to in the older processes. This method even reproduces in the oil the slight differences caused by the timely or untimely harvest of the flowers, the time for which varies with different kinds of flowers, and is generally best learned by practice.

Roses should be collected during the morning and while entirely opened, jessamine should be gathered before sunrise, while cassia flowers always give an agreeable perfume, although differing decidedly with the time of the day when harvested. This method, although first described by Millon, was practiced some twenty years ago by Robiquet and by Buchner in the extraction of a few especial perfumes. But what renders it most valuable for this country, is the fact that all the ethereal solutions mentioned can be effectively replaced by purified petroleum naphtha, or gasoline. Its volatility renders its regeneration by evaporation at a low heat practicable, which does not injure the perfume, and some experiments, made with reseda, May flowers, white lilies, cinnamon, vanilla and cloves, werevery satisfactory, as the extract produced in this manner is easily transferrable to alcohol, which leaves fat and coloring matter undissolved. The last traces of petroleum adhere rather tenaciously to the perfume, but are removed by a slight heat, a current of air playing at the same time over the extract. The perfume of the flowers is a fixed oil, seldom a volatile principle, and is therefore retained, when the naphtha is removed in the manner described. It remains unchanged in the atmosphere, unless its temperature is raised above its normal degree. It dissolves apparently without decomposition in alcohol, ether, fats, sulphide of carbon, chloroform, benzine, etc. It is capable of infinitessimal division, spreading rapidly in the air, where its pleasant odor betrays its agreeable presence. It is equally divisible in water to which a small quantity imparts a strong flavor, but it is so susceptible to chemical action, that an alcoholic extract of a perfume mixed with common water is rendered odorless, unless its quantity is exceedingly great, while pure distilled water preserves the full energy of the original aroma.

The extraction of the perfume of flowers is of immense value to commence, as a small bulk represents the aroma of an exceedingly large amount of flowers, and can be carried in this manner with great convenience to all parts of the world. It has been proved repeatedly, that the aroma of flowers is the same in intensity in all climates, and there is no reason why we should not produce as good extracts more abundantly, than is done now by France, where this branch of industry is one of the most important.

A NOVEL MODE OF TREATING COFFEE.

A somewhat novel case, involving a patent for treating coffee, was recently tried in the Superior Court of this city. One of the features of the process consisted in running it through black lead which gave the coffee a shiny metallic appearance. It appeared in the trial that William Newell sold to Ezra Wheeler & Co., in March, 1858, the exclusive right to use such patent in the State of New York and other territory for the sum of $5,000, and the further sum of six cents for every bag of skimmings, and ten cents for every bag of merchantable coffee passed by the defendants through the process of the plaintiff, and that the defendants should keep an accurate account of every bag of coffee that passed under said process, and to render monthly returns of the same verified under oath, and to pay over in cash on the first of each month the plaintiff's share of such earnings so stipulated for, the defendants having also the privilege of commuting the tolls aforesaid by the payment of the further sum of $15,000 within three years; and that the defendants took the interest aforesaid, paid to the plaintiff the $5,000, and used the patent; and the plaintiff alleges as breaches of the said contract:—First—That the defendants neglected to furnish the plaintiff with monthly returns of the number of bags of coffee they had passed through said process, and to pay the tolls due for the same. Second—And that the defendants have neglected to keep the plaintiff's interest in said agreement inviolate, by keeping in active operation the machinery in said agreement contemplated and used by the defendants, and have neglected to make the same available and productive, etc., and demands judgment for damages for such neglect. The defendants admit the contract, as set forth in the complaint, but allege that the plaintiff, to induce them to enter into the same, represented to them that by its use large sums of money could be made; that great improvement could be made in the appearance of coffee; that its value would be materially increased, and its merchantable quality improved, and its price enhanced; and that it would be made much more saleable; which representations the defendants allege are untrue, and that the process to them was valueless, and claim to recover the five thousand dollars paid, and to have the contract annulled; that running the coffee through black lead gave the coffee a metallic lustre, detrimental to its sale; that by reason of its effect upon the coffee—the loss in weight, the peculiar appearance it imparted to the coffee, the expense of operating and cost of renovation, and the depreciation in value arising therefrom—it became impossible to obtain any considerable employment for it, and none was obtained for which a true account has not been rendered.

The case was not disposed of, but the lovers of good coffee will be slow to believe that the beverage can be improved by the application of black lead.

As many as 26,000 vehicles often cross London Bridge in a day.

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Correspondence

Information for Running Circular Saws.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN, on page 319, written by Mr. J. W. Churchill, I notice an article on sawing lumber. Some of his directions are correct, but I think he has committed some errors which I take the liberty of correcting. He says "the saw should range into the carriage half an inch in twenty feet," which I am sure is altogether too much. Suppose a sixty-inch saw is ranged one-half inch to twenty feet, it would range into the carriage one-eighth of an inch in the diameter of the saw, which is altogether too much. He says that "the mandral should have nearly one-eighth of an inch end play." End play is not only useless, but detrimental to the working of a circular saw. He says "the end play is to make the saw self-adjusting, as the governor in a steam engine, as to speed and motion."

Are we to understand by this that the end play regulates the speed (or motion) of the saw? He goes on to show, that if the saw is running out at the log, the latter will crowd against the center and change the range of the saw and cause it to run in again, and *vice versa*, if it is running into the log. Thus the saw is continually running in and out just in proportion as he gives it endwise motion. Endwise motion is just what will cause his saw to run in and out, and saw lumber like washboards.

I have taken the endwise play off of more than fifty mills; wherever I have been called to straighten and hang a large circular saw, having followed that business for more than fifteen years, seven of which were in California, where I straightened and put in operation more than one hundred and fifty large circular saws to saw the *mammoth* timber of that country, where saws as large as seventy-two inches are used.

The only advantage possible in lateral motion is where the carriage runs crooked, which is too often the case, lateral motion will permit the saw to go with the log; in such case the saw should have as much end play as the carriage runs out of true, and the saw guide should move with the saw. But, I ask, what mechanic would run a saw in that condition? Were the carriage ran out of true, lumber could not be sawed of uniform thickness in that way. The carriage should run as true as the bed of an iron planer.

He also says "the underside of the tooth should range eight inches from the center for hard wood, and ten inches for soft, and that twelve inches is not too much for a large saw." Now, if we take a thirty-six inch saw and range the angle of the underside of the teeth ten inches from the center, we have a very hooking tooth. Also, if we take a seventy-two inch saw, and range the teeth twelve inches from the center, we have a very blunt tooth. Thus it will be seen that the angle of the teeth will depend wholly on the diameter of the saw. He also says "the tops of the teeth should range one-fourth of an inch below the point of the next tooth back of it." I am surprised that a practical man should give such a rule. In that case the angle of the teeth will be determined by the distances the teeth are apart. He further says "he files the teeth a trifle shorter on the log or carriage side, to contract the range of the saw into the carriage."

This is the first time I have ever heard of a saw running (or inclining) toward the short corners of the teeth, as all saws will incline toward the long corners.

RULES FOR HANGING AND USING A CIRCULAR SAW.—First, the saw should be hammered flat on the log or carriage side, and all difference in thickness between the center and rim should be on the board side of the saw. The first and most important of all, is to know that you have a saw that is properly made. To test a saw, try the teeth with a set or wrench. If they bend readily and do not show a good spring temper they are too soft for use. Gage the saw, and see that it is equal in thickness. The most important of all is, the manner in which the saw is HAMMERED. Stand the saw up perpendicular, try a straight edge over the log or face side of the saw, and see that it is true, then lay the saw down flat, and raise one side, holding it up with one hand, allowing it to rest on the teeth at the opposite side—lay a straight edge from the mandrel hole to the rim at right angles with the part held up and the part resting on the floor. The saw should drop just so you could see daylight under the center of the straight edge—this is called a little open. Should it rise up, it is called fast. A saw that is fast between the center and rim will always work bad if it gets the least warm on the rim or at the teeth. Go all around the saw in this way, then try the straight edge across the center of the saw with the center of the straight edge over the mandrel hole. The center of the saw should rise a little, just so you can see daylight under each end. This indicates the saw a little fast in the center. In this position the saw will bear a little warmth on the rim from friction of guide, also in the center from warmth of the box. Should the saw show too open or drop, say one-sixteenth of an inch, in appearance below the straight edge, it will be too limber to run stiff.

Nine hundred feet per minute is the proper speed to run the rim of a saw, it is then traveling nearly two miles per minute. Shingle or other saws, made very thin on the rim and thick in the center, or attached to large collars, may travel twelve hundred feet per minute with safety. Such saws running at greater speed than nine hundred feet per minute, should be hammered open in the center so they will fall a little below the straight edge, as the centrifugal force of the saw, when at great velocity, will expand the rim. The saw should line into the log just as little as possible, and have the log pass without bearing against the center of the saw, or so that the teeth will rise without cutting the log or timber.

There should be no lateral motion as it is sure to guide the saw from a direct line. The carriage must run true. The pitch of the tops of the teeth should be regulated by the amount of feed that the saw is to carry. For example, an edging saw should have more pitch to the tops of the teeth than a siding saw. So if a log is fed into a saw four inches to each revolution, the teeth must have more pitch than if it is only fed one-half inch. The pitch must be sufficient to clear the tops of the saw teeth when in the cut. Draw a circular line to the points of the teeth, then file the angle so that the back of the tooth will be below the circular line one-eighth of an inch. One inch from the point of the tooth is a very good rule for one-inch feed, but is subject to variation according to the feed required. The teeth of circular saws should be filed as hooking as they will possibly stand to cut; of course lathe saws where the stuff is fed by the saw under the arbor, and side cutting shingle saws, where hooking teeth will draw the timber into the saw too fast, are an exception. The pitch of teeth of large circular saws for pine, spruce, hemlock, etc., may be obtained in the following manner: A line of sixty degrees from the horizontal, will form an equilateral triangle, and may be formed by striking a line or circle whose diameter is one-half the diameter of the saw, and drawing a straight line from the points of the teeth to the outside of the circle. The throats under the teeth must be sufficiently large to retain all the saw dust, carry it through the log, and discharge it below. A large saw is often cutting, say, through thirty-two inches of timber, and one-sixteenth of an inch to each tooth. Thus, each tooth will cut a shaving, one-sixteenth by thirty-two inches, which would fill a space one inch by two inches, or equal to two square inches of solid timber, as thick as the saw cuts. If there is not two square inches of space under each tooth, the dust cannot act free, but must crowd somewhere. It is often the case, however, that the teeth cut one-eighth of an inch each, the saw dust of which would fill four square inches. If the space under the tooth does not contain that amount, where does the surplus dust go to? It must be crowded, between the saw and lumber and packs against the latter, heating the saw on the rim by the friction, and will often be seen caked on the side of the timber. The saw teeth should be filed square across both top and bottom, the points should be kept well spread, gradually tapering back from the point, and the saw must, to do good work, be kept round, so all the teeth will cut the same amount.

It is also very essential that the saw should be kept balanced. Sixteen thousand feet of lumber was sawed from clean hemlock logs in Messrs. Grant & Vansant's mill, in this city a few days ago, at once putting the saw in order, and without making a bad run.

JAMES E. EMERSON.

Trenton, May 16, 1866.

Taxing Inventors.

MESSRS. EDITORS:—For twenty years I have been a constant reader of your most excellent journal, and have always admired your fearless opposition to all unjust legislation affecting the rights of inventors. Other journals seem indifferent to the claims and interests of this most useful class of our citizens, and yet deprive those journals of patented improvements, and what, I ask, would now be the condition of the "art preservative of all art?" For one, I heartily thank you for opposing Mr. Jenckes's scheme of placing an extra load upon inventors.

As a class they are willing to bear their share of the burden of taxation now needed to maintain the honor of the nation; besides, they are willing to pay to the Patent Office all that is just and proper. I ask in all justice ought anything more to be required of them? I think not. Therefore, I protest against this new bill and call upon the Hon. Mr. Cowan, our U. S. Senator, who is also Chairman of the Committee on Patents, to kill the measure. He has the power and influence to do it, and represents among his constituents thousands of inventors who naturally look to him for protection. The money of inventors has been squandered to daub over a large hall in the Patent Office somewhat after the style of Indian art out in Idaho, and not content with having got this barbarous daub out of our pockets and some $130,000 beside, Jenckes wants us to pay more for having our cases carefully examined and decided. The whole thing is wrong.

AN INVENTOR.

Harrisburg, May 19, 1866.

The Reviewer Reviewed.

MESSRS. EDITORS:—Your correspondent on "The Gear Question Reviewed," in your issue of May 5th, seems to labor under a material misapprehension of the case and of facts connected with it.

He virtually admits that it is correct to measure the given pitch of a gear on the arc, instead of on the chord. Now this is all that has been contended for, by one or two others and myself, in former communications. But he proceeds to say, that since it is impracticable to form the teeth properly, it becomes necessary to measure the given pitch upon the chord. That is to say, we will remedy a difficulty in the practice, by introducing an absurdity into the theory.

Now let us see how far beyond the facilities of the present day it is to produce teeth practically correct; and what the difficulty in that respect has to do with the doctrine, that a spur gear should be considered as a polygonal prism instead of a cylinder.

In the first place he asserts that "if the contour of the teeth is formed of the proper epicycloidal curves, the teeth of each wheel must be formed with special reference to the size of the wheel with which it runs;" and that "correctly adapted epicycloidal teeth are almost wholly unknown in ordinary machinery." Both these statements are erroneous.

Epicycloidal teeth, adapted with practical correctness, are well known and extensively used; and in forming them, it is not necessary that each wheel should be especially adapted to the particular one with which it is to work.

Professor Willis, who is entitled to the thanks of all mechanics for his thorough investigation of these matters, has shown that if the teeth of all the gears in a set be bounded by epicycloids formed by one common describing circle, rolled in each case on the pitch circle for which a tooth is to be formed, any two of such a set will work correctly together. And he has shown that the proper diameter for such a describing circle, is one half the diameter of the smallest pinion to be included in the set (in most cases 12 teeth).

Now, after describing any one of these curves, it will be found that a center and radius can be taken, with which an arc of a circle can be described, which will not perceptibly vary from the short portion of an epicycloid required. And Professor Willis has constructed an instrument which, when properly applied

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to the radius and pitch circle of a wheel, gives two centers from which to describe those arcs; one, which always falls within the pitch circle, from which to describe that part of the tooth lying without it; and another which always falls without the pitch circle, from which to describe that part of the tooth within it.

And the teeth thus described are to all intents and purposes epicycloidal teeth.

This instrument Professor Willis has very properly named the "Odontograph" or "tooth describer." And by its use, or by other methods producing the same substantial result (the odontograph is not "the only simple means of determining the center and radii"), large quantities of racks, gears and pinions, coarse and fine, cut and cast, are made. And when all the steps are carefully taken, including that of recognizing the pitch as a distance to be measured on an arc, the work is good, and worked handsomely.

But the odontograph above mentioned, your correspondent of May 5th, has entirely ignored, and only drawn attention to another and quite distinct one (see fig. 1. of his communication), which gives a curve approximating to an involute. This form of tooth is much in use for fine gearing, say to one-half inch pitch, for which it is very well adapted. It is not, however, so desirable a form, where much power is to be transmitted.

To the statement that "Scribner, Haswell, and Nystrom, all recognize this fact in their valuable pocket-books" (*i. e.* the fact that "it is essential that the pitch be measured on the chord, rather than on the arc"), I have two things to say. First, that however we may respect those authorities, their recognizing an absurdity as a fact would not make it so. And second, the formula which they all give for finding the diameter of a gear, is utterly inconsistent with the recognition of any such "fact." Here it is:

Pitch×No. of teeth÷3·1416=Diameter.

Further argument on that statement is not needed, as this formula can apply only to a circle, and not to its inscribed polygon.

Now, as to why it is sometimes best to increase the diameter of a pinion beyond what is correctly required by its pitch and number of teeth. This is called by mill wrights "giving the pinion a little lead;" its effect may be seen by a moment's consideration.

When a small pinion is working with a rack—we will take such a case as an example—each tooth of the pinion approaching the line of centers, exerts a lifting or crowding pressure on the rack. After passing that point, its tendency to draw the rack down is about as great as that to lift it, depending on the form of the teeth, their smoothness, etc. But in any case, the action of the teeth after passing the line of centers, is far more easy than before passing that point. If then, our teeth are formed by "rule of thumb," or our gearing is roughly cast, it will be an advantage in its working to have most of the work done by those teeth which have passed the line of centers—and increasing the pitch of the pinion is evidently a very simple means of causing it to be so done. In very unfavorable cases, it may be best to increase the pitch of the pinion to the extent which would measure the pitch on the chord; with well formed teeth and good castings, a good deal less is quite sufficient; and with well formed and well adjusted cut gearing, no such increase is necessary or desirable. And if guessing means using judgment in proceeding according to circumstances, then guessing is eminently proper in cases like the above.

Now, if circumstances sometimes render it necessary, as a mechanical expedient, to increase the pitch of our pinions, let us own up that it is a mechanical expedient, and not try to elevate it into scientific correctness by the aid of trigonometry.

I may mention that your correspondent of May 5, can obtain more particular information as to the two kinds of odontograph by consulting "Appleton's Mech. Dictionary," article "Gearing."

CALLIPERS.

Worcester, May 10, 1866.

A Slight Mistake.

MESSRS. EDITORS:—Some time ago you described a small steam boiler which had 50 tubes, 4 inches long and ½ inch diameter, the same being vertical. It is not necessary to describe this boiler at length, but in reckoning up the fire surface, I find that in the tubes there are 300 inches area, and in the fire box 144, exclusive of the crown sheet, which would doubtless make about 6 inches more; call it all 150 inches. This would make the total heating surface 450 square inches, perhaps a little more or less. Dividing this by 12 square inches, in one square foot, gives 37 square feet, or nearly three horse-power in a boiler only about 16 inches high, which is far too much for a small thing. J. W. M.

Philadelphia, Pa., May 9, 1866.

[Our figures do not come out quite the same as this correspondent's. We find 144 square inches in one square foot, and but 3 square feet and 18 square inches in 450 square inches, which is sufficient for a small engine 2 ¼ inches diameter and 4 inches stroke. —EDS.

Cipher Writing.

MESSRS. EDITORS:—I send you herewith a communication inclosing two cipher dispatches, with their translation. These documents came into my possession, at the close of the war, while I was an officer in the Union army. I send you the translations, but would suggest that the cipher be published (if agreeable to you) alone, in order to give your readers an opportunity to try their skill at translation.

I have read several articles in magazines, etc., in regard to Systems of Cipher, but have seen none that could not be translated. I have a very simple system, practical and easily used, which *cannot* be translated without the key, and which I will send you, if you think it of interest to your readers. ? ? ?

Norfolk, Va., May 10, 1866.

Confederate States of America,
Military Telegraph.

Dated Hd. Qrs., Feb. 25, 1865.

Received at Richmond 12 o'clock 25 mins. A. M.

To HON. J. C. BRECKENRIDGE, Sec'y of War:—I recommend that the TSYSMEE—FN—QOUTWP—RFATVVMP—UBWAQBRTM—EXFVXI— and ISWAQJRU—KTMTL—are not of immediate necessity, UV—KPGF—UBPGR—MPC—THULFL—should be—LMQHTSP.

R. E. LEE.

TRANSLATION:

I recommend that the *removal of public property, machinery, stores,* and *archives, which* are not of immediate necessity, *be commenced. All powder* should be *secured.*

Hd. Qrs. C. S. Armies,
March 24th, 1865.

Gen. E. KIRBY SMITH, Com'd'g Trans-Miss. Dept.:

GEN.:—Vvg—ecilmympm—rvcog—wi—lhomnides—kfch—kdf—wasptf—us—tfcisto—abxc—bjx—azjkhmgj—siimivbceq—qb—ndel—ueisu—ht—kfg—auhd—egh—opcm—mfs—uvajwh—xrymcoci—yu dddxtmpt—iu—icjqkpxt—es—vvjau—mvrr—twhtc—abxc—iu—eoieg—o—rdcgx—en—ucr—pv—ntiptyxec—rqvariyyb—rgzq—rspz—rksjcph—ptax—rsp—ekez—raecdstrzpt mzmseb—acgg—nsfqvvt—mc—kfg—smhe—ftrf—wh—mvv—kkge—pyh—fefm—ckfrlisytyxl—xj-jtbbx—rq—htxd—wbhz—awvv—fd—acgg—avxwzvv—yciag—oc-nzy—fet—lgxa—scuh.

. . . . . .

I am, most respectfully, your obd't serv't,

R. E. LEE.

[It would give us great pleasure to receive the cipher, and in accordance with our correspondent's suggestion, we retain the translation, so that our readers can try their skill.—EDS.

Blue Vision.

MESSRS. EDITORS:—I take the liberty of reporting a curious phenomenon which I experienced a few days ago, a similar case of which I do not remember of having noticed in scientific records.

When opening my eyes in bed early one morning (about 5 o'clock, in full light), I was surprised at seeing all the dark objects in the room, the dark furniture, frames, cast shadows, etc., in a most beautiful, intense, velvety blue

Being afraid, lest the magic vision should vanish by a mere winking of the eyes, I kept as still as a fossil, and only turned my eyes quietly around to observe other things in the room; everything of color except the dark brown or black, appeared in the natural color; white, green; red, etc., were not affected at all. Calling my sons to rise (who sleep on the other side of the room, a little forward), I saw, at their rising, their hair—but nothing else on them—delightfully blue! Having enjoyed the sight long enough, I closed my eyelids, and on opening, everything appeared as usual.

I know the effect of taking santonine by experiment, long ago, when everything appeared greenish, yellowish or bluish. But here, nothing but the dark objects changed blue. The only thing which might possibly have "a cause" in the matter, is that I had manipulated considerably with cyanuret of potassium the day before. My sleeping room is well aired and spacious, at least 60 by 30 feet, and with windows only on one side, some thirty feet to the west behind the head of the bedstead.

Have any of your readers experienced anything like it? C. M.

[The seeing things which do not exist is always indicative of disease. The disorder is often of the imagination only. The case of our correspondent is certainly an interesting one, and we are unable to explain it.—EDS.

A Difficulty in the Way of Perpetual Motion.

MESSRS. EDITORS:—I see occasional references by your correspondents to the invention or discovery of perpetual motion. There is one point about this I have never seen referred to, which it seems to me an individual contemplating trying his hand on such invention, would do well to consider—that is, if an individual who seriously contemplates such an effort is sane enough to consider anything. Suppose a machine were invented which generated its own power, and consequently started and moved itself, by what process or possibility could its motion be restrained or regulated? It must do one of two things—stop, or run itself to death; as it seems to me the laws which govern machines moved by agencies or forces, such as steam, water or horse-power, applied externally, as it were, to the machine, are not applicable to a machine which is expected to develop from its own levers, cranks, wheels, etc., the power which moves it. Were it possible to develop such a power, it occurs to me clearly, its force must go on increasing and its motion accelerating from the moment of starting until a separation of the parts would necessarily follow. A governor or regulator, or resistance of any kind, would either stop it entirely, or, failing in that, would prove useless, for any such appliance would only develop a new point of resistance to starting, which, overcome by the inherent power of the machine, the results would ultimately be the same as if the resistance were not there. Of course this objection, if well founded, is only one phase of the law which makes any such invention impossible; but it may be that some who cannot see the difficulties or impossibilities in the way of starting a machine, may see the force of this suggestion in case they should get it started. If they cannot be reasoned out of the delusion, they may possibly be terrified from the creation of a monster, which like "Frankenstein," will be exceedingly apt to crush or devour its creator. G.

Milwaukee, Wis., May 16, 1866.

Boilers Rusting.

MESSRS. EDITORS:—I have an upright tubular boiler in my dwelling house, for steam heating; now, may I trouble you to answer the question, shall I, to save my boiler, draw off the water and leave it empty until next fall, or shall I leave it as at present, half full? Which is the best method? The boiler is in my cellar. A SUBSCRIBER.

New York City, May 10, 1866.

[This is a very common trouble with steam boilers laid by. Iron does not rust so rapidly under water as out of water, and it is therefore better to keep the boiler full of water, but even that would not stop rusting entirely. Since the boiler is in the cellar it would sweat if the water was drawn off entirely, and the boiler would then dry and rust very fast. There is, doubtless, a slight coating of sediment or scale on the tubes and sheet, which will protect it somewhat. —EDS.

AN enormous bronze cannon cast at Metz, in 1857, is about to be brought to Paris. Its length exceeds 13 feet, its calibre 1 foot, and its weight twelve tuns. It will be consigned to the Museum of Artillery.

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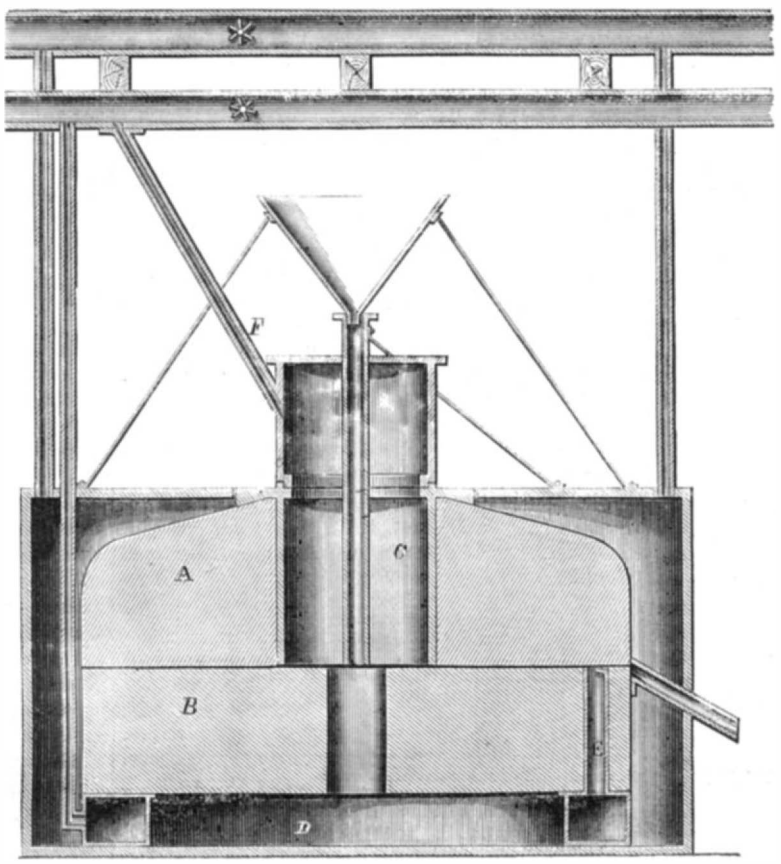
New Method of Ventilating Mill Stones.

This engraving represents a new method of ventilating mill stones by passing currents of air between them, so that the heating which usually occurs is obviated, and more flour, of a better quality, is obtained.

In the engraving A represents the upper stone, and B the bed stone. A chamber, C, is formed in the upper stone, through which the air passes into the eye of the lower one. Beneath this there is an air chamber, D, into which the ends of the tubes, E, open. These tubes are fixed in the bed stone and extend quite through it from top to bottom. At the face of the stone they communicate with the grooves of the same. The air is forced in by an air pump or other similar agent through a short pipe, F, and passing between the stones and into the tubes, E, of the lower stone creates a thorough circulation. The result is easily seen in the quantity and quality of the flour as the stones do not get clogged or the grain heated in grinding.

Patented through the Scientific American Patent Agency, Dec. 19, 1865. For further information address John Kemp, Corn Exchange Mills, 272 East 23d street New York.



KEMP'S METHOD OF VENTILATING MILL STONES.

Australian Intercolonial Exhibition.

Mr. J. G. Knight, Secretary of the above institution, sends us a letter and pamphlets announcing that an exhibition of the products of Australian skill and ingenuity will take place at Melbourne in 1866.

The year is now so far gone that goods would probably arrive too late to benefit American manufacturers, and for this reason we regret that the notice given was so short. Mr. Knight informs us that there is a great want of improved mining machinery of all kinds, both for metals and coal, for boring and tunneling the earth, as also for drilling through rock. The commissioners desire to exhibit all mechanical improvements of this kind that can be gathered together, believing that by so doing the interests of the colonies, as well as those of the home manufacturers, will be materially promoted. Full-sized machinery or working models would be equally acceptable, and as the building in which the exhibition will be held, is to become hereafter a public museum and department of industrial art, such mechanical illustrations could remain permanently acceptable to the public, thus securing a publicity far beyond that of the few months during which the exhibition will be open. According to the wish of the exhibitors the goods would be thus kept for permanent exhibition or handed over to any authorized agent at the close.

The Game of Croquet.

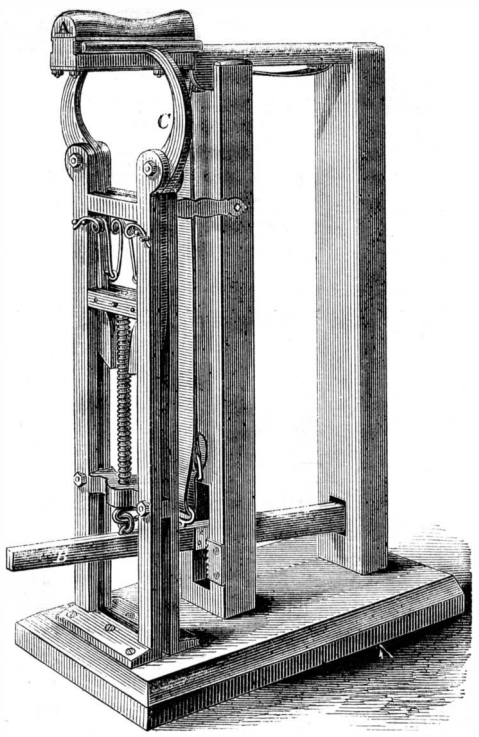
Out-door amusement for ladies and children is an object very much to be sought for and encouraged; especially for those who are penned up in our large cities and towns. The want in this respect can only be met by some game that will afford exercise and amusement at the same time. The recent introduction of the game called "croquet" fully meets all the conditions named, and it is rapidly becoming a popular exercise. The patent croquetries manufactured by Milton Bradley & Co., Springfield, Mass., combine several useful improvements and are superior to any that we have seen.

SHAW'S CLAMP FOR STRETCHING SHOE UPPERS.

All shoemakers will appreciate this invention, as it is intended to save a great deal of hard work.

It is intended as a device for holding firmly and straining the upper leather or fabric of shoes during the process of rubbing down the seams. In using it the seam is placed lengthwise with and over an iron form, A, corresponding in shape to the seam. The lever, B, moved by the foot, and held fast by a rachet, operates the jaws, C C, while the form is lifted sufficiently to produce the required strain. The seam is then rubbed down, both hands of the operative being at liberty for the purpose. The form is lifted by means of an inclined plane operated by a strap attaced to the lever, B. The inclined plane is returned to its place by means of a spiral spring.

Heretofore the rubbing down of seams in the uppers of shoes has usually been done on a rounded stick of wood, held on the lap, one hand straining the seam apart while it is being imperfectly rubbed down by the other. In the case of covered seams the work is is still more clumsily performed.



The saving of time and labor, to say nothing of the more perfect work, and the facility it affords for trimming the welt, amounts to more than would at first be supposed. "In our own factory," say the proprietors, "after a few days' use, one boy accomplished, easily, the work of five men, thus making a saving of over $40 per week, besides doing the work much better."

A patent is now pending on this machine through the Scientific American Patent Agency; for further information address the assignees and proprietors, Bradley & Metcalf, Milwaukee, Wis.

How Ropemakers Work.

The Brooklyn *Times* gives the following facts in relation to the hours that ropemakers work:—

"There is a popular misapprehension as to the internal economy of a ropewalk. Everybody who toils in a ropewalk is not dignified by the title of ropemaker. It is only those who spin and lay that are considered ropemakers. The ropemaker is paid by the piece, and invariably commences to labor with the break of day, even if he is likely to have but an hour's employment. Their day's toil is generally over at noon, or, at the latest, 3 o'clock. There is another class—composed of men, women, and boys—who do the rude labor, and attend upon the machinery, etc. These go to work with the ropemakers, but, unlike them, are expected to toil until six o'clock. This is the class that unsuccessfully struck the other day, and we are inclined to sympathize with them. Ten hours per day is quite as much as should be expected of them or any other operatives.

"Our 'boss ropemakers' will probably smile at the estimate which is placed upon their incomes by a Boston cotemporary. Let him quadruple the sum he has given as annual income, and then double that, and he will begin to approximate toward the profits of ropemaking during the past few years."

The estimate given was, that one had an income of $25,000 per annum, and another ropemaker was classed among the millionaires.

A Novelty.

There was recently exhibited at the Manchester Literary and Scientific Society a singular mineral that was found in a nodule of clay ironstone from the North Staffordshire coal field. On careful examination it appears to be a mineral mass in a semi-crystalline state. The form of the mineral appears to have been spherodial, with crystals radiating from the center. It consists chiefly of carbonate of lime, carbonate of iron, and phosphate of lime, with traces of magnesia, alumina, and organic matter, and 10 per cent of silica. He also exhibited a beautiful white specimen of carbonate of strontia, obtained from a vein of carbonate of lime. It occurred among the lime in radiated masses, similar to those of carbonate of barytes, as sometimes found in veins of sulphate of baryted. This mineral has been obtained in considerable abundance, but up to this time it is believed that no use has been found for it on a large scale.

THE Chicago and North Western Railroad Company recently executed a mortgage to secure the payment of $2,500,000, which covers 603 miles of railroad, and all the depot grounds and other lands and rolling stock belonging to the same. The lines of road covered by the mortgage are the following: The road from Chicago to Green Bay, Wisconsin, 242 miles; from Chicago to Fulton, Illinois, 136 miles; from Chicago to Freeport, 121 miles; from Kenosha, Wisconsin, to Rockford, 73 miles, and from Belvidere to Beloit, 21 miles. The United States revenue stamp affixed to the mortgage is for $2,500.

TINMEN'S TOOLS.—We have letters from the South inquiring where the above tools can be purchased. Manufacturers will find it for their interest to advertise in the SCIENTIFIC AMERICAN.

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SUPPLEMENT.

With the last five issues of the SCIENTIFIC AMERICAN, we have published a four-page supplement, which has been regularly sent to all our mail subscribers, and sufficient copies have been delivered to the American News Company to supply all those who receive their papers through agents. A supplement is also issued with the present number.

LEGISLATION ABOUT PATENTS IN CONGRESS.

Considerable attention is being given to patents in the House of Representatives, On the 16th inst. the Committee on Patents reported a bill for the relief of Delia A. Jacobs, which authorizes the Commissioner of Patents to extend the patent for an improved method of dressing treenails—the original term having expired August 28, 1862. Mr. Myers, who supported the petition, stated that no other persons have been using this patent since its expiration, and that there was a general desire that the widow of the patentee should have the benefit of the extension. A provision was incorporated in the bill that no parties shall be held to account for damages for any use of the invention since the patent expired.

Mr. Myers declared that the widow was now almost entirely supported by the little pittance given her by Wm. H. Webb and James Udall, of New York City. The bill passed by 57 majority—64 members not voting.

Mr Myers, from the same Committee, reported a bill for the relief of William Mann and Jacob Senneff. It appears that Mann obtained a patent July 11, 1852, for improvements in the manufacture of copying paper made of equal parts of manilla and cotton, which will expire July 11, 1866. Being absent in Europe, he was not aware that ninety days' notice must be given of the application for extension. Mr. Washburne opposed the bill, and intimated that if a party "was swelling through Europe it was his own fault," and objected to the way the thing was being done.

Jacob Senneff obtained a patent Jan. 13, 1852, for a metallic heddle, used in looms for passing the warp. This patent expired the 13th of last January, and being in the military service—employed in the hospital and in the volunteer refreshment saloon at Philadelphia, Mr. Senneff thus lost his chance to obtain his extension and only discovered his loss when it was too late to apply to the Commissioner under the general law.

The bills in these cases were simply to authorize the Commissioner of Patents to hear and decide them upon testimony, as in all other extension cases. Considerable debate ensued, and Mr. Washburne hit a vital point when he declared that these parties were only in the same condition with hundreds of others. The bills were passed.

Mr. Bromwell, of Illinois, from the Committee on Patents, reported a bill authorizing the Commissioner of Patents to grant an extension for seven years of the patent issued December 6, 1845, to Thomas D. Burrall, for a corn sheller, and extended for seven years from Dec. 6, 1859, by the Commissioner of Patents. The proposition now is to allow another extension for seven years, which, if obtained under the provisions of this bill would make three terms or twenty-eight years.

Mr. Harding, of Illinois, who opposed the bill, stated that the patentee "has been receiving large rewards for his invention during twenty-one years, and now he wants to continue the same business." Mr. Bromwell declared that the patentee was an exceedingly old man and exceedingly poor, the question being simply whether Congress was willing that the Commissioner of Patents should hear such cases, and decide as he deems right in view of the rights of the public and the inventor. The bill was passed.

We have carefully read the discussion upon these various bills, and while it seems to be very plausible and very just in its general features, we warn our readers that it has a much deeper significance. These comparatively minor bills are brought forward and passed to establish precedents and try the temper of the House; that the larger extension cases will soon come, we have not a doubt.

EXPERIMENTS IN AERIAL NAVIGATION.

Aerial navigation is by no means a subject of modern speculation. Many fabulous accounts of the doings of the ancients in this department of science, have reached us through the traditions of the elders. We are told that they constructed artificial wings, and by attaching them to the body, undertook by muscular exertion to rival the birds of the air.

In the fourth century one Archytas constructed a wooden pigeon that could fly by means of an inclosed spirit; but the author fails to tell us what that spirit was. At a much later period the famous Bishop Wilkins was so confident of success in this art, that he intimates that in future ages it would be as usual to hear a man call for his wings, when going a journey, as to call for his boots. Experimenters in aerial navigation, however, when they came to better understand the elastic properties of the air and the gases, dropped the wing theory, and turned their attention to balloons as the more feasible scheme. The first air balloon was constructed in 1782, by Dr. Black, of Edinburgh, and since that period many ingenious enthusiasts have followed the subject with patient hope and confidence, but as yet without great practical results.

In a lot on the corner of Houston and Greene streets, Dr. Solomon Andrews, of Perth Amboy, N. J., has on exhibition an aerial ship of peculiar construction, which is now nearly completed, and the inventor proposes soon to remove the doubts of all skeptics by an experimental trial.

Many of our readers will remember that in the early part of the war efforts were made to adapt ballooning for the purpose of reconnoitering the position of the enemy. These efforts were but partially successful, no valuable results having been secured, and at the close of the war, among other rubbish, were two army balloons, which found in Dr. Andrews a ready purchaser. These he has used to form the buoyant portions of the Aereon, which resembles in shape a long lemon, and which is covered with a net work, and connected by ropes, cords, and pulleys to a car suspended some twenty feet below the balloon. This balloon, when inflated, will contain 40,000 cubic feet of gas, capable of supporting a depending weight of two tuns.

The car or basket is of wicker-work, and cradle-shaped, about fifteen feet long by two feet wide. Another car, about three feet long, placed on runners, is put inside the basket, and secured by tackle, so that it may be held in any desired position and made to serve for purposes of ballasting.

The inventor's theory is, that as the motion of the balloon will be in that direction in which least atmospheric resistance is offered, it is claimed that it will move, not vertically, as other balloons do in a still atmosphere, but upward and onward in the direction pointed to by its bow on an ascending plane. When sufficient hight has been attained, the aeranaut will open the valve and discharge gas, at the same time stepping forward to the bow end of the basket, which will depress the bow of the Aereon, before elevated. thus guiding her direction on the descending plane. Having gone sufficiently low, still in the same direction, he will throw out ballast and again ascend, and so on, thus progressing to his journey's end in the ziz-zag mode in which a ship tacks against a head wind. On a near approach to the earth, Mr. Andrews says, he has only to step to the middle or rear end of his basket, and thus elevate the bow and check the momentum; then sail horizontally for a short distance, or throw out more ballast, and move on the ascending plane. He further claims that his rudder will turn his vessel as readily, or more so—the medium being less resistant—as a ship is turned in the water.

Dr. Andrews claims, and with justice, that he is at least entitled to the indulgence of the public till he has shown them that the time and the man have come to control the wind and navigate the air, or fail in the attempt to do so.

WHEN STRIKES WILL SUCCEED.

A great many strikes have recently been made among the workmen of this city, and on another page will be found a summary from the *New York Tribune* of the results. It will be seen that in about one-third of the cases the strikers carried their points, and in about two-thirds they failed. It would have been easy in every case for an intelligent observer to decide beforehand whether the strike would succeed or fail.

Wages in the city of New York at the present time range from less than one dollar per week to more than one thousand dollars per week, and throughout the whole range, from the youngest sewing girl or errand boy to the most eminent lawyer, all would like to get more for their services, while the employers would like to obtain the same services for less pay. The employer always offers the lowest rate that he finds will command the special service that he requires, and the employed is always ready to work for some other person at the smallest increase in his wages. The rate is, therefore, adjusted at the money value of each one's labor in the market.

But labor, like other values, is constantly fluctuating. The multiplication of labor-saving machinery, the accumulation of capital, the increased intelligence and thrift of workmen, and many other influences, tend to raise the rate of wages; while the destruction of machinery, manufactories and other kinds of active capital by fire, wars, enforced idleness, and other influences, tend to reduce it. Generally the causes operating to raise wages are more powerful than those tending to lower them, and during the present century wages of common laborers have advanced from seven dollars a month to twenty.

Now, wages are less sensitive to changes in the market rates than most other values. Workmen with families dependent upon them will frequently plod along at the old rates, when there is actually a demand for their labor at higher wages. We are told by the proprietor of a job printing establishment that it is very difficult at the present time to get good journeymen printers—that there is a great scarcity in the market of this kind of labor. If this is true, it shows that the wages paid to journeymen printers is below the market. The phrase, "the demands exceeds the supply," has no meaning except in connection with a specified price or rate. The "market rate" means the rate at which the demand just equals the supply. If the proprietors of job printing establishments would make the proper advance in the pay, the scarcity of journeymen would quickly disappear, and if it is true that print-

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ers are working below the market, a strike by them would be certain of success.

The reason why the fifteen hundred car drivers of this city lost their situations by their strike, instead of getting increased wages, was, that there were plenty of other men able and willing to fill their places at the old wages—in other words, they were getting the market rates for their particular kind of service.

We may denounce the natural laws of supply and demand, if we have a fancy for empoying our tongues or pens in that way, but the power of these laws is irresistible—like death, they are something that we must all yield to. Whether a strike for higher wages will succeed or not, depends wholly upon the fact whether the wages being paid at the time are or are not below the market.

THE DECIMAL SYSTEM OF WEIGHTS AND MEASURES.

On the 17th inst., the House of Representatives passed laws which legalize the use of the metrical or decimal system of weights and measures in the United States. The important movement met with no opposition, and it is probable that within a few days the action of the House will be confirmed by the Senate, when the metrical system will become the law of the land. In the beginning the use of the system is not to be compulsory but optional with the people. As soon, however, as it becomes well enough understood, it will entirely supersede the present system. In order to make the system familiar to the people it is proposed to issue one or more new coins which shall represent some weight in grams and measure in a simple fraction of the meter. The post offices are also to be supplied with gram weights, and mailable matter is to be estimated in grams, and a set of standards of the new weights and measures are to be supplied to each of the State capitals. It will be remembered that in the new system all weights and measures are deduced from a single unit, the meter, which is nearly equivalent to the ordinary yard.

WAGES IN PITTSBURG.

The matter of wages is an interesting one. The merchant turns quickly to the markets in the morning paper to see how he stands, and to know what the ruling prices are, and we are sure that our readers will be glad to know the state of the market that regulates their affairs. According to the *Mining and Manufacturing Journal*, published in Pittsburg, the following rates are those now paid to some trades:—Puddlers, $8 per tun; bar rollers, $3 25; bar heaters, $1 25; plate rollers, per day, $7 50; plate heaters, $6; guide rollers, $4 75 per day; sheet rollers, $11; laborers, $2—an average increase of 10·54 per cent over the rates of 1865. Glass blowers are paid highly, it would seem. Vial blowers receive $55 per week, and window-glass blowers $63 per week—their wages have increased 33·23 per cent in one year. At that time the average rate of good workmen (of all trades, we presume) was $2 50 per day—it is now $3 50. Apprentices receive $5 per week. The wages of first-class machinists have advanced 10 per cent in one year.

NEW PUBLICATIONS.

BRASS AND IRON FOUNDING.—D. Van Nostrand, 192 Broadway, New York.

Every person whose interests are in any way connected with the manufacturing arts, must have felt the want of such a work as this. One man cannot carry all the minute details of a trade in his head, and if he does not have recourse to books for the information he needs he will obtain it from friends. We have had many and frequent inquiries from our readers for recipes like those contained in this book, and we hope they will avail themselves of it. Many who are experimenters, with a view to improve certain parts of machines, others who are merely amateurs, and dabble in metallurgy from a pure love of it, will find in this work full details as to the method of procedure in all cases.

Besides the usual formulæ for the compositions of zinc, tin and copper, and other metals used in common work, the author introduces some instructions and recipes, not generally known, as to molling, facing, and similar processes. We extract one recipe which will be useful to many:—

TO CAST IN BREAD PASTE.—Take the inside of fresh bread, and work it up well with vermilion—the longer the better, until it becomes viscid and tough. It is then to be worked well into the mold. After having obtained the mold, it must be fastened down upon a piece of wood, by wetting it so as to prevent it from warping as it dries. After it has been thoroughly dried you may oil it, and then obtain as many casts as you please from it, in plaster, wax or sulphur.

By means of bread paste a traveler may always take a model of any small object of interest he meets with on his journey; and thus a proper knowledge of its mode of use becomes invaluable. Scrolls, ruins of tombs and temples, etc., have often thus been copied and brought home at a trifling cost.

The author is Mr. Jas. Lakin, at one time foreman of the brass foundery in Messrs. Reanie & Neafie's works, Philadelphia, Pa., which is a guarantee for the practical value of the book.

NOVELTIES IN INVENTION.

One day, two years ago, we walked through the outer office of our premises, adjoining the editorial rooms, and saw an interested group about a novel affair. On closer inspection this novelty proved to be a doll that walked. In its body was a train of gearing that through the intervention of eccentrics lifted the feet and propelled the little mockery across the floor. This proved a great success as an invention, and thousands of them were sold.

Soon after this a man brought in a figure of a Sambo suspended by a wire proceeding from his back, and put together, as to his limbs, with great freedom. The feet of Sambo rested on a spring board. When this was played upon by nimble fingers the image danced in a most natural and life-like manner; the heels and toes kept time and raked down "Ole Virginny" in the most approved manner.

This also was a good thing from a pecuniary point of view. Wherever one went the face of Sambo met the eye, with his everlasting grin, and hat like a wash basin crowning the summit of his uninteresting countenance.

Again our attention is requested to another novelty. This time to no black dancing dervish; to no handfull of flowers and lace, but to a cock that crows in the morning, or at eve, when you blow in his tail. The streets resound with the noise of Chanticleer, and one is constantly reminded of that mighty feathered warrior—the bantam—who almost splits his throat in attempts to out do the Shanghai.

This new toy is a little affair, made out of tin, not larger than half a dollar. By a little practice one is able to imitate the crowing of a cock very accurately, and if we may judge by the quantity in the hands of the juveniles, the invention is likely to prove a success.

And all this introduction brings us to the point: There are no inventions which are more successful than those which afford amusement. People like to be tickled, and they flock by thousands to the circus, the theater and the comic lectures, where hundreds go to hear "the weightier matters of the law" expounded. So it is with novelties in the way of invention. A new toy for children sells quickly, and turns into money as rapidly as anything we know of. As the holidays approach we find great activity prevailing in this branch of the Patent Office.

BAIRD'S SIMPLIFICATION OF THE SCREW ENGINE.

In a report to the Secretary of the Navy, dated Nov. 28, 1864, Mr. Isherwood stated that in the machinery designed by him for the navy, "the governing principles have been fairness of parts; strict connections without articulations; simplicity of combination, with such arrangement of the essential organs as to admit of easy access and constant observations; great extent of wearing surfaces in guides, journals, etc., and a strength of parts insuring against fracture from bad materials, workmanship, bad management, and the greatest possible abnormal strains." If we add to these "governing principles" the Isherwood point of cut-off, viz., seven-tenths of the stroke of the piston, we have reduced to a short and convenient rule, for practical men, the results of six years of continued coal-burning experiments. It is very remarkable that the contents of two quarto volumes (compiled at an expense of thousands of dollars of the public money) can be thus clearly condensed into practical shape. Notwithstanding the fact that Mr. Isherwood's "governing principles" are so plain, and have been so completely demonstrated by the extraordinary economy (in some of the screw engines, a horse-power is actually attained with five lbs. per hour per horse-power) and the wonderful speed of screw steamers fitted with his engines, marine engineers refuse to be convinced, and still plod along in the beaten track. No doubt this is caused by that absurd professional jealousy which, unfortunately, exists more or less in all professions; but we are happy to be enabled to chronicle one exception at least to this rule. The eminent engineer, Mr. John Baird, the constructor of the machinery of the U. S. S. *Quinsigamond* and class, appears to have been guided, in planning this machinery, by Mr. Isherwood's teachings in relation to screw-engine construction. In the *Quinsigamond* engines, the bold conceptions of our steam Galileo have been carried into practice by Mr. Baird, the most celebrated constructing engineer of the time, who, on account of the tastefulness of his planning, has been appropriately called the Michael Angelo of steam engineering. Having shown why it is that these engines are regarded with so much interest by the profession, no apology is necessary for what follows.

The *Quinsigamond* is fitted with two independent propellers, each actuated by a pair of engines attached to a right-angled crank shaft, the cylinders of the port propeller are placed on the starboard side, and *vice versa*. They are spread apart sufficiently fore and aft to allow the cast-iron framing, which carries the main bearings of one engine, to be placed between them. This frame for the other engines is, of course, placed on one side, forward, and on the other, abaft, of the two cylinders. Bolted directly to the head of each cylinder are two condensers, with openings cast in them, through which passes the main shaft of the next engine on the opposite side; they also support the main cross-head guide. As the two cross heads are placed between the two condensers, with the ample space of some 20 inches of space between them, the upper guide bar partially covering the opening, they are of course very easy of access.

As there are four cylinders, there are of course eight condensers. This arrangement not only simplifies the machine, but at the same time it adds to its economic performance; for it a good vacuum can be obtained with one condenser, a better one can be obtained with two. Further, if one is fractured by a shot, or otherwise injured, another remains, which, no doubt, has sufficient capacity to perform double duty. If each condenser has, as usual, a bilge, as well as a sea injection, there will be no less than sixteen injection cocks or valves; this is of no importance, for by suitably arranged levers and bell cranks, three or four men can work the whole of them.

The condensers are of the ordinary jet variety. Surface condensers were not adopted, probably, because the cylinders are so proportioned relatively with the boilers that between 40 and 50 lbs. pressure must be carried in order to work off the steam. Surface condensation would no doubt add to the formation of scale; which experience has shown increases in a far higher ratio than the pressure.

In order to add as much as possible to the simplicity, durability, and reliability of the engines, as well as to insure a perfect vacuum, each condenser is fitted with two air pumps, or sixteen in all. Every one will perceive that these sixteen air pumps add greatly to the reliability of the engines, for if one is disabled, there will be fifteen left; if two, there will be fourteen, and so on. Some "uncanny" person may urge as an objection to such a number of air pumps, that it involves additional cost in the construction, and an unnecessary complication of parts, but even a cursory examination will refute this absurd idea. These pumps are operated by means of horizontal rock shafts, which obtain their motion from the main cross heads. By this arrangement, only sixteen pump levers and eight levers for the cross-head links, with their necessary connecting links, are required; thus there will be but 32 links, with 64 journals, for connecting the pump cross heads with their rock-shaft levers, and for connecting the main cross heads with the horizontal rock-shaft levers, but 16 links more, with 32 other journals, are necessary. The journals of the horizontal rock shafts (which are supported by a neat and elegant frame

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work of wrought iron) are obviously not worth mentioning. The whole of this single air pump gear is so arranged as to admit of "easy access and constant observations," and the "simplicity of combination" is apparent. Each engine is fitted with 3 feed or bilge pumps, or only 12 in all, which are actuated by suitable rock shafts. These, through a dozen or more links, receive motion from the air-pump rock shafts. The pumps are arranged with greater simplicity than the air pumps, as all their "articulations" require but 64 journals.

As before mentioned, the main shaft bearings are fixed in cast-iron frames, which are placed opposite the respective cylinders, to the two condensers of which they are attached by 4 long bolts. The bearings are not made in the usual complicated and unhandy way, with binders and bolts, but consist of large rectangular openings cast in the frames, in which the brasses are placed, and the shafts inserted; and the cranks are then keyed on the shafts; this forms "a strict connection without articulations." If it becomes at any time necessary to remove the shafts, on account of fracture, or to bore out and line up the bearings, instead of going through the troublesome process of unscrewing bolts and removing binders, it is simply necessary to remove the cranks from the shafts (or if they stick, to cut them off) and hoist out the whole fix.

The valve gear of these engines merits particular attention. It is well known that such engineering enthusiasts as Maudslay & Sons, Penn & Sons, Randolph, Elder & Co., R. Napier, Humphreys & Tennant, and hosts of others, both in America and Europe, have wasted much time and ingenuity in so arranging their engines that they can be easily handled. These gentlemen, whose ingenuity appears to have run away with their judgment, did not reflect on the absurdity of providing means by which one man can start, stop, and reverse them, while there are thirty or forty men standing looking on in the fire-room. It is Mr. Baird who utilizes the wasted force by making them seize upon that part of the valve gear necessary to be moved. Then they can operate it without the intervention of such wretched contrivances as either steam or hydraulic cylinders.

We are happy also to see that Mr. Baird has thrown such new-fangled traps as link-motion reversing cylinders, etc., to the winds, and used the old and reliable device known as the "gab." In fact, this engineer employs it almost exclusively on his screw engines, and has always expressed a decided preference for it. Each engine is fitted with three eccentrics, one for going ahead, one for backing, and one for working the cut-off valve. The two former are provided with "gabs" which, by properly arranged levers and bell cranks can be thrown in and out of gear. If the engines one stationary, and it is required to start them, all "gabs" being out of gear, long iron levers, called starting bars, are inserted in the valve rock shaft. Three or four men seizing the end of each of these bars, work the valves until the "gab" falls into gear, and away she goes. Of course the starting bars (4 in all) must be quickly removed, or the men must stand one side, or be hoisted by their own petard. It is thought that with 12 men, stationed at the starting bars, and 4 or 5 more to operate the "gabs" and injection valves, the engines can be promptly started, stopped, and reversed. Should the valves at any time stick fast, nothing is easier than to attach a tackle to the ends of the starting bars and lead the rope along the fire-room or the berth deck, which ever may be the most convenient.

The main cylinders are 46½ inches in diameter, by 60 inches stroke, and the boilers, which are of the ordinary English horizontal tubular variety, contain some 23,755 square feet of heating surface, and 893 square feet of grate surface. Hence it will be seen that although the engines cut off at seven-tenths, some 50 lbs. pressure must be carried in the boilers in order that the engines can begin to work off the great quantity of steam they will generate, particularly as they have a large area through the tubes for draft and are provided with enormous blowers.

The *Warrior* and *Black Prince*, English ironclads, have the same sort of boilers as the *Quinsigamond*, their boilers have 23,197 square feet of heating surface and 868 square feet grate, and the area for draft is nearly the same, but although the boilers of the English vessels are smaller, they have about 60 per cent more capacity of cylinders. These are two in number, with a diameter of 112 inches (effective 104 inches) by 48 inches stroke. The sad mistake of putting in cylinders so absurdly large has been abundantly demonstrated by the performance of these vessels. They have never been able to develop, even in service, but little over 6,000 horse-power. It is expected that owing to the cylinders being proportioned in accordance with the full-stroke theory, the *Quinsigamond* will develop at least 3,000 horse-power.

Hence it is seen that although Mr. Baird has fitted these engines with an independent cut-off valve, the cylinders are so proportioned that it can be dispensed with without detriment to the economical performance of the machine—this is quite important in case of derangement of the cut-off.

There are many other points which mark the "simplicity of the combination" of these engines, but we will mention but two more. The main cranks, which, we are sorry to say, many screw-engine constructors have of late made mere chunks of wrought iron, devoid of symmetry, are in this case charming to look at—there is no superfluous metal.

It is said that in one set of these engines, a stationary five-inch steel rod is to be introduced, passing through the center of the piston and secured to both heads of the cylinder. This simple and elegant device, it is expected, will keep the piston from jostling the sides of the cylinder; the spring of this rod by the weight of the piston when it is in the center of it, it is thought, will add to its proper action.

It will be only necessary to add, that for symmetry of proportions and "maximum maximorum" strength (as Mr. Isherwood would say), with minimum weight of materials, the *Quinsigamond* engines are surpassed by none and equaled by few. Their constructor has, in this case, surpassed himself; in a word, they are characterized in a marked degree by that stern Calvinistic simplicity, taste, and grace, for which Mr. Baird has long been celebrated.

We have thus seen what can be accomplished, when, on the one hand, one of the most distinguished constructors in the world makes his plans in accordance with the views of the chief of the Steam Bureau, and consults him freely in relation to them; and, on the other, the chief of the Steam Bureau, without any of that petty professional jealousy which is, alas, but too common among engineers, gives in return the benefit of his great learning, experience and constructive skill. That Mr. Baird has submitted to be guided by the demonstrations of Mr. Isherwood in proportioning the principal and "essential organs" of these engines, shows him at once to be a man of liberal views and sound understanding.

STARTING BAR.

Boston, May 10, 1866.

MISCELLANEOUS SUMMARY.

WATER METERS.—A premium has been offered by the Industrial Society of Amiens, in the following terms:—The proprietors of steam engines are in want of a water meter which will indicate exactly the quantity of water injected into the boiler, whatever be the pressure. This apparatus must be one easily set up, not subject to get out of order, and capable of registering the quantity of water to within two per cent of the actual volume. It is not a memoire that the society wishes for, but an apparatus in working order on which experiments can be made; and if a water meter be presented appearing to be of practical utility, the society will use every effort in its power to promulgate the use of the contrivance. The meters to be experimented on should be sent to the office of the society before March 1, 1867.

SINCE 1862 the boot manufacturing business of Chicago has increased from one small establishment to fifteen, which turns out nine hundred cases per week, consuming three hundred dozen sides of upper leather, sixteen hundred sides of sole leather, and fifty dozen calf skins. About twelve hundred hands are employed in the business.

THE New York *Times* opposes the proposition to increase the tax on inventions, in an intelligent article which we republish in another column. It takes the same view of the subject that we have urged.

THE VOLTAIC PILE.—The Corps Legislatif o France has adopted the following projected law:—Art. 1 A prize of 50,000 francs to be awarded to the author of the discovery which will render the voltaic pile applicable, with economy, to the following purposes: To industry as a source of heat, to illuminating purposes, to chemistry, to mechanics, and to practical medicine. The rules to be adopted for the conditions and the judgment of the said competition will be determined by a decree. Art. 2. In case that no prize shall have been awarded at the period fixed by the above article, the competition can be prorogued, by a decree of the Emperor, for a new period of five years.

AN INVENTOR WHO LACKED FAITH.—At a recent meeting of the stockholders of the Atlantic cable project, Mr. Cyrus W. Field amused the assembly by several anecdotes of suggestions which had been made to him. One gentleman had gravely proposed to him to sink a hollow tube in which to go down and seek after the cable, and he was so annoyed by the continued calls at his hotel that one morning he told his visitor that it should be done, and that the author of the idea should make the first attempt. He had not seen him since.

A BUSINESS firm in Memphis detected a thief quite adroitly recently. They missed money from the till for some days, amounting to $250, but could not detect the guilty party. The cashier, as an experiment, emptied into the drawer some nitrate of silver. The thief went to the till to make his evening capital, and in abstracting the money covered his hands with the nitrate, which he was unable to get off. An examination of his paws in the morning proved the fact, and the guilty party was arrested.

A PRACTICAL and thorough agriculturist, backed by manufacturing skill and capital, has sent to this country from France a shipment of six tuns of the finest Silesian beet root. Illinois is the State chosen for his experiment, and upon the property devoted to the culture a large sugar refinery is to be immediately erecred.

THE difficulty of making sound and valuable castings from old—and often remelted—alloys of copper and tin or zinc arises from the oxidation of the tin and copper, which Dussausoy has shown to take place in such proportions in gun metal that for one part by weight of the tin oxidized, from three to four of copper are so.

OF the total power developed by the engines of the *Warrior* 77½ per cent are applied to the screw and 22½ per cent expended in overcoming the friction of the machinery, while of the total power imparted to the screw rather more than ·771 per cent is expended directly on the propulsion of the ship; showing only ·6 for the resultant efficiency of engines and propeller combined.

AN extensive series of experiments, conducted by Mr. Mallet, upon the effects of additions, in minute but atomic proportions, of porous hard metals to the binary alloy of copper and zinc known as Muntz metal, embracing antimony, lead, iron, bismuth, arsenic, and silver, proved that, in every instance, the ductility, tenacity, flexibility, and resistance to torsion were seriously impaired by proportions under even 1 per cent.

THERE are in all, including steamboat piers and railway stations, fifty-two inlets to the city of London, through which in the course of each twenty-four hours no fewer than 706,621 persons enter, a number equal to one-fourth of the entire metropolitan population, or, added to the sleeping population, to more than the entire population of Dublin, Edinburgh, and Glasgow put together.

A MAMMOTH still covered with its skin and hair, and in an excellent state of preservation, has been recently discovered in the neighborhood of Taz Bay, Gulf of Obi, enveloped in ice. The Russian government has sent M. Schmidt to examine the animal.

RECENTLY a torpedo, which was sunk in Charleston harbor over three years ago, exploded in eight fathoms of water. It is said to have lifted an immense volume of water, and presented a grand appearance.

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Ship Launching.

The difficulties which attended the launching of H. M. S. the *Northumberland*, coupled with the fact that the tendency of the age is materially to increase the tunnage of ships, whether destined for mercantile or defensive purposes, seem to point to the speedy abandonment of the practice of launching ships, which never was entirely devoid of risk and danger. It has been said that no engineering enterprise must now be deemed impossible, provided only that ample funds are forthcoming for its execution. We are willing to give ample credit to the ability of our engineers, but we are by no means inclined, unnecessarily, to put that ability to the test. It is by far too costly a proceeding to rely upon, the utmost stretch of their skill to effect results are daily called for; neither is this a course which engineers would recommend; for the President of the Institution of Civil Engineers, in his address delivered January last, laid it down as a maxim for young engineers that, "they must be prepared, if necessary, to advise their employers that the objects which are sought are not commercially worth the cost of the means which would secure them."

The launching of ships of the largest class, although it has hitherto proved practicable, has certainly, in two memorable instances, been attended with most important drawbacks. To the anxieties attending the launch of the *Great Eastern* has been attributed, and not without some reason, the early death of its gifted designer; and the outlay attendant on the protracted operations, which ultimately forced the reluctant ship into her native element, must have been very large. The more recent instance of the *Northumberland* is commonly reported to have occasioned an outlay of thirty thousand pounds, in the efforts made to get her afloat. If, now, time had been an object in preparing this formidable ship for sea, and circumstances might very well have transpired to call for her immediate equipment, the hitch in launching this ship might have proved a national misfortuue.

The authorities are pretty well agreed that the untoward arrest of the ship on the launching-ways, after moving down some 170 feet, was due to the departure from the usual inclination in the construction of the ways; but this again is generally considered to have been dictated by no undue caution. Our cotemporary, the *Engineer*, who is no mean authority on the point, in speaking of the launch, says:—"The immense mass of the vessel renders her practically uncontrollable; and if she had been launched a little too fast, she might easily have run right across the river, and injured herself seriously on the opposite shore before she could have been brought up." Again, in *Engineering*, a similar opinion is expressed. The writer says: "The general incline of the ways is less than that usually adopted: and when we consider the difficulty of controlling the motion of such an immense mass as the *Northumberland*, there certainly seems to be a good reason why this should be the case." He then cites an instance of a vessel launched from the Millwall yard breaking away and running down a vessel moored on the other side of the river. The naval architect, therefore, in adhereing to the practice of launching, has to steer between his Scylla and Charybdis—a dead lock on the ways, and a destructive run.

But, it will be asked, what is to form an efficient and reliable substitute for the launching ways now in use? In reply to that question we may cite the following words of the President's address already referred to, viz:—"That hitherto the inventive genius, the patient perseverance, and the indomitable energy of the members of our profession, have not been found unequal to the tasks they have been called upon to perform." We are not however sure that any fresh efforts of inventive power are required to insure this desired result. Resort may be had to dry docks. But then it will be said that the expense of dry docks is enormous, and that in many localities they are impracticable. This may be so, but there are plans for meeting these difficulties which deserve the serious attention of naval architects. Let us take, for example, one designed and patented in the year 1857 by Mr. Lungley, the general manager of the Millwall Company, by whom the *Northumberland* was built. He proposed to construct dry docks and basins for stowing away vessels, which might enter at all tides, and be left high and dry above the level of the sea or river. To this end he made use of the natural level of the land, and built up his dry docks and basins thereon, connecting the dry dock with the basin, but so that they might be cut off therefrom by gates when required. The basin he connected with the sea or river by means of an outer dock or channel, provided with double gates, and the water level of the basin be maintained at an artificial hight. If, now, this plan was feasible for repairing and stowing away vessels, there is no reason why it should not be equally applicable for floating newly-built vessels. The natural level of the ground being used, will insure the docks from the influx of land springs, and any leakage into the docks from the basin is readily disposed of by gravitation.

There is, however, another plan and one that has the advantage of being in practical operation at the Victoria docks, that might, with a little modification, be adapted to the use of shipbuilders. We allude to Mr. Edwin Clark's hydraulic lift and saucer or pontoon. The vessel to be docked is floated over the sunken saucer or pontoon, and the latter is then raised by the simultaneous action thereon of a series of hydraulic lifts, until the ship is raised out of the water. The buoyancy of the pontoon or saucer is then restored, and it is floated off with the ship upon it to a shallow dock, for inspection and repairs.

Here again are the main requirements for insuring the safe and easy transfer of a vessel of any tunnage from the stocks to its native element. We trust, therefore, that the time may not be far distant when—by a judicious and timely outlay of money by the Government and our large shipbuilders—the transit of our ships from land to water may be effected without risk, and at an insignificant cost; and the public, which never fails to become the ultimate sufferer wherever risks are incurred, will be relieved from the recurrence of those seasons of anxiety which were notably created by the launch of the *Great Eastern* and H. M. S. the *Northumbertand.—Newton's London Journal.*

New Patent Process in Wire Drawing.

The application of a new principle in the manufacturing process of wire drawing has just been made by a Birmingham firm—Messrs. Hibel and Colbourn, of the Long Acre Mills, Nechells - and its superiority certainly seems to claim for it a foremost place in the history of modern inventions, The improved process, which has been patented by Mr. John Hibel, consists of an entire alteration of the method of annealing. Under the old system annealing pots consisted of hollow cylinders of cast iron, closed at the bottom, and furnished with a lid or cover at the top, which was closed nearly air-tight during the annealing process. These pots were built in a furnace, and charged with the articles required to be annealed. When the pots were filled, the furnace was heated to the required degree, and allowed to cool, together with the pots. By this process, however, the surface of the wire became more or less covered with scales ,which had to be removed by pickling before the wire could be drawn to the required thickness. By the new process the annealing pots are constructed of two hollow cylinders of cast iron, of different diameters, the smaller one being placed within the larger; a ring-like space is thus left between the two cylinders, which constitutes the chamber in which the articles to be annealed are placed. The bottom of this chamber is closed, and the top is also closed and made air-tight during the annealing process. When these pots are placed on the furnace, the flames not only encircle them, but come up through the hollow center, and the wire is thus more thoroughly and uniformly heated. They are made air-tight by a simple process, and when the wire is taken out is as smooth as possible; there is no scale about it, and therefore does not require pickling, as under the old system. The quality of the wire is also much improved; it is considerably more ductile, and a considerable saving is effected in weight, as the process of pickling reduces the wire considerably. Under the old system a No. 4 rod. before it could be drawn to No. 19, would require pickling six times, and annealing five times; under the new system the same rod requires pickling once, and annealing once. By the old process it would take eleven days to draw the wire to the required thickness; but by the new plan it is done in five days. It will theretore be seen at once that the saving of time, fuel, and vitriol (for pickling) must be very great, while the quality of the wire must be much improved.—*Ironmonger.*

A PATENT has been brought out by Messrs. Bond, Russell, and Fisher, of Newport and Tredeger, Monmouthshire, Eng., by which the refuse material from ironworks can be turned to profitable account in substituting it for emery. The inventors have found that slag possesses all the properties of emery, and by their process they make it even superior to emery for polishing steel, iron, brass, copper, and other metals.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING MAY 15, 1866.

Reported Officially for the Scientific American

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54,658.—Bed Bottom.—John Randolph Abbe, Providence, R. I. Antedated May 7, 1866:

I claim the springs, B, applied to the head and foot rails, a a, of the bed stead in combination with the springs, B, rods, C, provided with knobs, d, and the slats, D, having concave surfaces to receive the knobs, all being arranged substantially as and for the purpose set forth.

54,659.—Corn Sheller.—Augustus Adams, Sandwich, Ill.:

I claim in combination with a series of feeding throats in the hopper of a corn-shelling machine. the use or employment of a rotating bar or shaft, M, provided with one or more suitable projections or angles, or a series of projections or angles corresponding with said series of feeding throats, arranged and operating substantially as herein specified and shown, and for the purposes set forth.

54,660.—Water Wheel.—I. J. W. Adams, Galestown, Md.:

I claim the arrangement of the penstock, E, scroll, C, frame, d, wheel, B, with its sides, a a, and brackets, c, as described, shaft, A, crank, G, and box, H, operating in the manner and for the purpose herein specified.

54,661.—Harness Motion for Looms.—A. L. Anderson, Ware, Mass.:

First, I claim the combination of mechanism for moving loom harnesses consisting of the treadle, E, arm, G, pieces, a a, wheel, H, levers, d d, and cords or similar connections, e e, when arranged and operating substantially in the manner herein set forth.

Second, Connecting the arm, G, both to the lathe, D, and to the harness operating devices as shown, so that it may actuate both simultaneously, substantially as herein described

54,662.—Railway Car.—Edward H. Ashcroft, Lynn, Mass.:

I claim a safety car constructed with a water space, one or more showering pipes, and a fusible plug apparatus, arranged substantially in manner and so as to operate with respect to the car chamber, as specified.

And in combination with a car so made. I claim a heating apparatus and a circulation coil, or the equivalent or equivalents thereof applied to the water heating space, substantially as and for the purpose, and to operate as explained.

54,663.—Apparatus for Molding and Drying Peat.—Edward H. Ashcroft, Lynn, Mass..

I claim the herein-described mode of preparing peat for fuel namely, filling the molds, compacting the same, drying, and discharging at one operative, in the manner substantially as set forth

54,664.—Skiving Machine.—William S. Atchley, Williamsburg, Ohio:

First, I claim the combination of the adjustable bed plate, A2, with the knife blade, B, when the two are arranged together so as to operate, substantially in the manner described and for the purposes specified.

Second, In combination with the above, the pressure roller, S, of the knife-carrying frame, K, arranged just in front of the knife blade, as and for the purpose specified.

Third, Hanging the roller, Y, in the bed plate, A, as and for the purpose described.

[This invention relates to certain new and useful improvements in machines, especially intended for the skiving of leather, although with slight additions it can be applied to the splitting of leather, whereby many important advantages are secured.]

54,665.—Applying Labels to Bottles.—James S. and Thomas B. Atterbury, Pittsburgh, Pa.:

We claim the bottle, having a label applied to a recess formed in it, and secured in such recess and covered by means of a soluble glass cement, as a new and improved article of manufacture.

54,666.—Axle Box Cover.—William S. Auchincloss, New York City:

I claim the arrangement of the square or polygonal-sided bolt, b, attached to the cover, B, and capable of manipulation by means of the bridge, C, substantially in the manner described and represented.

54,667.—Meat Chopper.—Daniel W. Baker, Harwich, Mass.:

I claim the combination of the bent arm, L, the post, D, or its equivalent, the knife and its slide rod, and the mechanism for imparting to the knife-rod its reciprocating movements. such mechanism being the lever G, the connecting rods, I K, and the gears on their shafts, the whole being substantially as specified.

I also claim the arrangement of the lever, R, its pawl, P, and spring, J, with the post, D, and lever, G, applied thereto, and to the knife shaft as described

I also claim the combination and arrangement of the guard, O, with the bent arm, L, and the knife and its rod, as applied to such arm, and to operate in the tub, as specified.

I also claim the combination of the spring latch, M, or its equivalent, with the post, D, the bent arm and the knife combined together, and with machinery for operating the knife, as specified.

54,668.—Machine for Opening Tin Cans.—W. K. Baldwin, Chicago, Ill.:

First, I claim the arrangement and combination of the standard, B, clamp, P, and guides, V, when constructed and operated substantially as described.

Second, The combination of the parts, H G and E, in combination with the bar, K, and lever, O, substantially as described, and for the purpose set forth.

54,669.—Cultivator.—Orlando Barr and Franklin F. Cox, Beloit, Wis.:

We claim the rod, B B, as shown in Fig. 1. The head blocks, "B B", sliding upon the said rod, B B, connected with the gear, b b, and foot-lever and section pinion, D, the sliding rods, A A, attached to the beams, "A A," and the device and arrangement of the draft rods, g g, and chains, e e, when constructed substantially as and for the purpose herein set forth and described.

54,670.—Sewing Machine for Stitching Cord to the Edge of Fabrics.—Wm. B. Bartram, Norwalk, Conn.:

First, I claim, in combination with automatic mechanism capable of producing both a forward movement and a lateral reciprocation of the material to be stitched, a cloth-holding device, which par-

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takes of the said lateral reciprocation, and between the upper and lower parts of which the said material and cord pass in their forward movement, for the purpose described.

Second, In combination with the laterally reciprocating table, A, the clamp or holding device, B, substantially as and for the purpose set forth.

54,671.—Sewing Machine for Stitching Eyelet Holes.—W. B. Bartram, Norwalk, Conn.:

I claim the combination of the cylindrical guide, A, and a presser-foot, D, with a rectilinear forward feed movement, and a horizontally-reciprocating mechanism, to effect a lateral feed of the cloth, for the purpose set forth.

54,672.—Raking and Binding Attachments to Harvesters.—Joseph Barta, La Crosse, Wis.:

First, I claim the wheel, E provided with pins, i, arranged in concentric circles, and the ratchet, F, connected with said wheel, and both placed loosely on shaft, D, in combination with the notched wheel, G, on shaft, D, the pawl, H, provided with lever, H', and the plate, I, all arranged substantially as shown and described, for the purpose of rotating the shaft, D, and consequently the raking and binding device intermittently, at longer or shorter intervals, as may be desired.

Second, The endless chain, S arranged to operate first in one direction, and then in the other, in combination with the plate, P, having the rake-head, Q, attached, the levers, o q, plate, R, and the staple, x, all arranged substantially as shown, to give the reciprocating movement to the rake, and also the rising and falling movement, substantially as described.

Third, The adjustable frame, O, on which the plate, P, works, for the purpose of adjusting the rake in such a relative position with the cradle as to cause the sheaves to be bound centrally, whatever the light or length of the grain may be, substantially as set forth.

Fourth, The pawls, n' n', applied to the plate, P, and arranged so as to be operated therein, in and out of gear, with rack, O', through the medium of the bent lever, O', at the time of raising and lowering of the rake, substantially as described.

Fifth, The cradle, C', and bar E', are arranged and combined as shown, so that the bar, as it is raised by the rotation of shaft, D, will raise the cradle with it, the cradle holding the gavel in position, and the bar, E, drawing the cord, r, around it, substantially as set forth.

Sixth, The twister, J, provided with jaws, w w', one of which is furnished with a hollow square, A'', in combination with the hook, b'', and the clamps, v' v', all arranged to operate substantially as shown, for the purpose of tieing the knot.

Seventh, The pivoted plate, o', operated from the shaft, D, and provided with slots, segment rack, etc., for the purpose of operating the hook, b'', and twister, J, as set forth.

Eighth, The apron, L, operated by the lever or arm, p'', cam, q, on shaft, D, in combination with cradle, C', and bar, E', all arranged to operate in the manner substantially as, and for the purpose specified.

Ninth, The shears, M'', placed on the bar, E', and operated from the shaft, D, to cut the cord, substantially as herein set forth.

[This invention relates to a new and improved raking and binding attachment for reapers, designed to be operated automatically throughout, from the driving wheel of the reaper, to which it may be applied. The object of the invention is to obtain a device for the purpose specified, which will be capable of being put in motion at longer or shorter intervals, as occasion may require, and be also capable of being adapted for binding long or short grain.]

54,673.—Saw Mill.—Marshall M. Bishop, Le Roy, N. Y.:

I claim adjusting the saw by means of the pivoted frame, D, racks, d d, pinions, E, and rachet device, S, arranged to operate as herein described.

54,674.—Mosquito Canopy.—Marshall Bliss, Grinnell, Iowa:

I claim the combination of the frame, A, so connected to the wall of a room that it can be elevated or lowered as desired, with the cord, b, or its equivalent, and the netting or canopy, B, substantially as specified.

[This invention consists in a canopy or mosquito bar for enveloping the whole or a portion of a bed, so arranged that it can be brought into a position to surround the bed, or thrown entirely away from the same, at the will of the person lying in the bed, without the necessity of a change in the position of his body.]

54,675.—Cotton Bale Tie.—Jas. Booth, St. Louis, Mo.:

I claim an improved cotton bale tie, A, constructed with three hooks, a a2 a3, and combined with the ends, B and C, of the hoop substantially in the manner described, and for the purpose set forth.

[This invention consists of a cast-iron bale tie, which is riveted fast to one end of the hoop, and which is provided with three hooks locking into notches in the other end of the hoop, the notches and hooks being so arranged that the strain of the hoop would be distributed among the three points of support, enabling the tie to withstand an immense pressure.]

54,676.—Paper Tin.—Edward H. Boswell, Philadelphia, Pa.:

I claim the arrangement of the calendar holders, A, elastic band, D, and pen-holding block E, in combination with a paper tin, of which one side is graduated, and the other raised, by projections, to act as a ruling guide, in the manner and for the purpose herein specified.

[This invention consists in certain improvements in the common paper tin, by which it is made to serve several purposes, in addition to its primitive use as a paper tin, viz: that of a letter clasp, a rule, a ruler—by which to draw ink or pencil lines.—a receptacle for pen-holders and pencils, and a calendar, for any of which purposes it can be used without injuring its qualities for any one particular purpose.]

54,677.—Stair Rod and Fastening.—Edward H. Boswell, Philadelphia, Pa.:

I claim the combination of the slotted rod, B, and the shouldered fastening, D, which, in one position, will admit the passage over it of the rod, retaining the latter by a partial revolution, substantially as described.

54,678.—Key.—Thomas S. Bowman, St. Louis, Mo.:

I claim the application to a key having a hole drilled in its shank or arbor, of a spring and stopper, substantially in the manner as and for the purpose herein set forth.

54,679.—Scoop, Sifter, Grater and Holder.—Frederick Bucknam, Portland, Me.:

I claim the combination with a scoop of the described form and kind of the roller, R, sieve, B, handle, H, having the grater and holder, G, made as specified, all constructed, arranged, and operated as set forth.

54,680.—Breech-loading Fire-arm.—John Burke, Courtland, Ill.:

First, I claim the combination of a telescopic joint in the barrel, with a hinged joint in the stock, when the barrel slides in the forward portion of the stock, substantially as and for the purpose set forth.

Second, The combination of the sliding barrel with the dovetailed bar and front portion of the hinge, substantially as and for the purpose set forth.

Third, The combination of the barrel with the front and rear portions of the hinge, substantially as and for the purposes set forth.

Fourth, The combination of the projection, r, on the front part of the hinge in the slot, h, with the rear part of the hinge, to hold the barrel at an angle, when loading, substantially as described.

Fifth, The combination of the catch lever, s, thumb bolt, n, and bar, f, substantially as and for the purpose set forth.

54,681.—Machine for Cutting Cloth.—Victor H. Buschmann, Baltimore, Md.:

I claim the endless belt-knife, constructed and applied, and operating substantially as described, and for the purpose set forth.

54,682.—Lock-up Safety Valve.—A. S. Cameron, New York City:

First, I claim the closed case, A, constructed substantially as herein described, in combination with a single disk safety valve, o, and lever, substantially as and for the purpose set forth.

Second, The notched standard, c, rising from the bottom of the case, A, and arranged relatively to the internal screw, k, applied substantially as and for the purpose described.

Third, The counter lever, G, in combination with the slotted bar, n, provided with a shoulder, p, and with the main lever, d, of the safety valve, constructed and operating substantially as and for the purpose set forth.

Fourth, I further claim a cap applied to the valve port or discharge port of a lock-up safety valve apparatus, for the purpose and in the manner explained.

[This invention consists in the arrangement of a closed case or box, which can not be opened except by the person authorized to do so, in combination with a single disk safety valve, with a single or compound lever, in such a manner, that while the openings are free for the ingress and egress of steam, the valve is protected, and cannot be tampered with. It consists, also, in the arrangement of a slotted counter lever, in combination with the closed case and main lever of the safety valve, in such a manner that the attendant is enabled to blow off without supplying the means of adding to the load of the valve.]

54,683.—Car Coupling.—Miles H. Card, Fulton, Ill., and John W. Stewart, Lyon, Iowa:

First, We claim the combination and arrangement of the guards, C, links, B, and cams, D, with the draw head, A, substantially as and for the purposes specified.

Second, We claim, in combination with the links, B, and cams, D, provided with the shoulders, m, the employment of the pin or stop, c, arranged and operating substantially as specified and shown.

Third, We claim providing the cam with the projection, n, operating as set forth.

54,684.—Fishing Tackle.—W. D. Chapman, Theresa, N. Y.:

I claim the combination of the fixed wire hook, E, spring hook, F, and snood, G, when arranged together, and so as to operate substantially in the manner described, and for the purpose specified.

[This invention relates particularly to trolling fish-hooks, so called, although it can be applied to other hooks, and it consists in a novel manner of hanging a hook containing the fly, or other bait, to one or more hooks, whereby, when so desired, it can be easily detached therefrom, and a hook, adapted for another and different kind of bait, as for instance, for minnows, used.]

54,685.—Sprinkler.—W. F. Class (assignor to Nathan Page), Cleveland, Ohio:

First, I claim the pipe, F, nozzle, C, and plunger, B, in combination with the cylinder, A, valves, H L, and perforated base, A', when arranged in the manner and for the purpose set forth.

Second, The lips, i, wings, n, and plunger, B, in combination with the valves, H L m, pipe, F, and nozzle, C, when arranged in the manner and for the purpose described.

54,686.—Apparatus for Expelling Air from Cans.—Daniel Clavidge, Indianapolis, Indiana:

I claim an apparatus for expelling the air from cans by pressure upon their sides, arranged substantially as set forth.

54,687.—Machinery for Forging Screws.—John Cochran, Township of Wall, N. J.:

First, The method of forming screw-threads upon metal bolts by means of forging dies of proper shape, in combination with a guide screw and rotating wheel, all constructed and arranged substantially as described.

Second, The combination of the tongs and guide screw with the forging dies and templates, constructed and operating substantially as described.

Third, The combination of the clevis with the sliding rods or templates, so as to sustain and move with the bolt or blank, while it is under the action of screw-forging dies, constructed and operating substantially as described.

Fourth, Controlling the space between dies, operating as described, as the operation progresses, by means of sliding templates, or their equivalent, so as to forge screws of uniform diameter or taper, or gimblet pointed, substantially as described.

Fifth, The combination of the sliding templates with the guide screw, by means of the slide rods and yoke, so as to be operated by it with an equal and simultaneous retractive movement, constructed and arranged substantially as described.

Sixth, The combination with screw-forging machinery, of the open bearing, r, clevis, in front of the dies, and the open-screwed bearing in the pedestal for the guide screw, so that a blank or bolt, and the detachable apparatus by which it is held and rotated, can be safely and expeditiously placed in, or removed from, the machine while in motion, and without interruption to the speed, substantially as described.

Seventh, The straight-threaded forging dies, in combination with the jumper, c, and anvil block, J, constructed and operating in the manner and for the purpose, substantially as described.

Eighth, The combination, in a screw forging machine of a screw forging die that has a positive and definite reciprocating movement, and a screw forging die that has a positive movement to or from the other, as required in the production of screws of varying diameter, when such movement of the latter die is caused and controlled by means of sliding templates, or their equivalent, substantially as described.

Ninth, The method of forming or making screws upon metal bolts, by operating upon and completing them from the neck or shank toward the point, by the means and in the manner, substantially as described.

54,688.—Device for Operating Ships' Windlasses.—Geo. Coffin, Boston, Mass.:

First, I claim the combination and arrangement of the windlass and its chain drums, operated by the toggle jointed levers, substantially as described.

Second, Regulating and checking the veerings of the cable by means of a lever, working in the top of the chain pipes, as in the manner described.

Third, The arrangement and construction, substantially as described, of the chain drums and brakes, by which they can be made to turn with, or be disengaged from the windlass.

54,689.—Rachet Attachment for Harvesters.—William Coggwell, Ottawa, Ill.:

I claim the combination with the pinion A, and shaft, B, of the adjustable pawls, C C', and ratchet, B2, substantially as described, to operate in the manner and for the purpose set forth.

I further claim the combination with the pawls, C C', and ratchet, B2, of the screw bolts, E E', and nuts, E E3, as and for the purpose described.

54,690.—Neck Yoke.—A. C. Cooke, Ohio, Ill.:

First, I claim the combination with a neck yoke of friction spools, C, substantially as and for the purpose specified.

Second, The manner of connecting the friction spool, C, to the bar, A, as shown and described.

[This invention consists in the employment, in combination with a neck yoke, of friction spools, fitted to ride upon the breast straps of the horses, in such manner that the jerking of the pole, when the vehicle is passing over uneven ground, will not affect the horses or wear out the breast strap in so great a degree as occurs in the usual mode of attachment.]

54,691.—Shoemaker's Jack.—Lewis L. Coon, Nunica, Mich.:

First, I claim the combination of the working shaft, C, and the standards, H H' H'', revolving at right angles to it, substantially in the manner and for the purpose set forth.

Second, So arranging the standard, H by means of a bevelled base and eccentrically placed screw that by using the nut, K, the last will be held firmly in place, substantially in the manner set forth.

Third, The combination of spring, D, sliding cone, E, and detents, F F, for the purpose of fixing the position of the shaft, C, substantially as set forth.

54,692.—Machine for Cutting Pegs out of Boots and Shoes.—Thomas Corey, Marlboro', Mass. Antedated Nov. 15, 1865:

First, I claim the arrangement in a machine for removing pegs from the inside of boots and shoes of cutters in combination with suitable mechanism for imparting rotary movement thereto, substantially as shown and described.

Second, In combination with cutters and machinery for imparting rotary movement thereto, I claim the frame provided with vertical and oblique arms or horns, substantially as and for the purpose set forth.

Third, So constructing the arms or horns of the frame, as to inclose and surround the cutters and mechanism in rotating the same, leaving only the cutting edges of the former to project, as shown and described.

Fourth, The arrangement of the rotary cutters in relation to their respective driving machinery and horns or arms so that they shall revolve on vertical axes, substantially as set forth.

54,693.—Gang Plow.—Thomas J. Cornell, Decatur, Ill.

First, The combination of the lever, M, and bent arm, O, for raising the beams from beneath at a point in the rear of their forward point of attachment, so as to be vibrated upon the said lifting device, by a weight applied to the forward end, substantially as described.

Second, The combination of the link, H, attached to the forward end of the beams and to the carriage, and operating substantially as described.

Third, The combination of the beam and the curved arm, or its equivalent, which in its backward motion operates to keep the beam down under the circumstances described.

Fourth, The mode of attaching the tongue to the carriage consisting of the laterally sliding socket and the guides, arranged and operating as described.

Fifth, The combination of the links, H, and standards, G, whose holes admit of the vertical adjustment of the links therein.

Sixth, The arrangement of the foot lever, R, the links, H, and beams, A, operating as described.

[This invention consists in devices for raising the fore and hind ends of beams for regulating their action and position, and in the mode of attaching the beams to the carriage, and in the mode of attaching the tongue.]

54,694.—Pipe Tongs.—Richard Cox, Philadelphia, Pa.:

I claim the jaw, c, serrated and shaped as described, swivelling upon the screwed handle, A, in the manner and for the purpose specified.

54,695.—Folding Hair Brush.—Charles Crosman, Tompkinsville, N. Y.:

I claim a hair brush, the handle of which may be folded over upon the brush head, the said handle being hinged or pivoted and having suitable catches for holding the two parts in an extended position, substantially as described.

[This invention consists in hinging or jointing the handle of a brush to the brush head in such a manner that the handle may be thrown back upon the said head piece, and thus be folded into a small compass when not needed for use.]

54,696.—Fruit Gatherer.—John A. Daum, Canton, Ohio:

I claim the adjustable bar, D, with set screw, F, screwed to the frame, A, when used as and for the purposes herein set forth.

The frame, a receiver, E, pipe, H, wheels, B B secured by lever, c c, and bar, D, arranged and used substantially as and for the purpose herein set forth.

54,697.—Ore Separator or Jigging Machine.—Thomas Davey, Haughton, Mich.:

I claim the combination of a double acting plunger pump with two sieves of a jigging machine so that each motion of the plunger shall force water through one or the other of the said sieves, substantially in the manner and for the purposes set forth.

Arranging the jigging sieves of an ore washer and separator, one above the other, substantially as and for the purpose described.

In combination with the sieves of a jigging machine, I claim the receiving hopper, B, provided with the perforated bottom, c, as and for the purpose set forth.

In combination with the sieves of a jigging machine, I claim the ore discharging chamber, L, provided with a gate or gates, as described.

In combination with the sieve and pump of a jigging machine, the partition, s, as and for the purposes set forth.

The adjustable pressure board, I, in combination with the pump and sieve of a jigging machine.

In combination with the sieves, D and J, of a jigging machine the passage, H, and shoot board, I, substantially as and for the purpose set forth.

54,698.—Sextant.—George Davidson, Philadelphia, Pa.:

I claim the combination of the spirit level, cross-wire reflector and double convex lens, or their equivalents, with the sextant, quadrant, octant, reflecting circle, or their equivalents, substantially as above described.

54,699.—Spinning Mules.—William C. Davol, Fall River, Mass.:

I claim the escape wheel or plate, p', on the clutch, P, constructed and operated substantially as described for the purpose of engaging and disengaging the clutch, P, at stated intervals, in combination with the fixed stud with the escape plate, W, and helper spring, 2, as above set forth.

Second, I also claim the fixed latch or stud, t, in combination with the escapements of the escape wheel, p', substantially as described for the purpose of moving and holding the escape plate clutch box, P, out of gear at intervals.

Third, I also claim the combination of the escape wheel, p' and the clutch box, P, with the stop finger, 14, and stop plate, 15, for turning the cam shaft, E, at intervals, substantially as described.

Fourth, I also claim the combination of the escape wheel, p', and the clutch box, P, with the escape plate, W, escape lever, y, and helper spring 2, substantially as described.

Fifth, I also claim in combination with the escape plate, W, the helper spring, 2, the escape lever, y, the stop finger, 14, the stop plate 15, and the catch or clutch box, P, with its escapement, p', arranged substantially as above shown.

[This invention consists in an improved mode of turning and operating the cam shaft of the mule. This is accomplished in a positive manner by a new combination in the arrangement of geared wheels and clutch box, and escape plate, with a fixed latch or stop for moving the clutch box out of and into gear at intervals, all of which operate in combination with another escape plate and escape lever with a helper spring for putting the clutch box into and out of gear. These operate together for turning the cam shaft one quarter of a revolution at intervals, in order to change the different parts of the mule in and out of gear.]

54,700.—Harness Snap.—George W. Devine, Ottamwa, Iowa:

I claim the within described snap as an article of manufacture, said snap made of wire with a loop at one end, and hook at the other, the two parts of the wire being twisted together or around each other, between the loop and the hook, for the purpose of making a firmer loop, and for binding the hooks together more securely, and thus throwing the tension upon both parts of the wire in whatever line the strain may be directed, substantially as herein specified.

54,701.—Plug for Washing Machine.—Ellis Doty, Janesville, Wis.:

I claim the inside plug valve for closing the discharge opening of the tub or chest actuated by spring or lever and maintained in open position by the engagement of a shoulder or pin with the edge or other port on of the chest, substantially as described.

[This improvement consists in a long pointed plug, held in place by a coil spring. It closes an orifice in the bottom of the tub through which the water is discharged.]

54,702.—Manufacture of Guard Finger for Harvesters.—Rufus Dutton, New York City:

I claim forming a guard finger of one uniform metal, as steel cutting, sawing or milling a slot therein, and tampering such slot on its under surface or edges while the body of the finger remains untempered or not hardened, substantially as and for the purposes set forth.

Forging a solid guard finger, cutting the slot therein and tempering such slot on its under surface or edges, substantially as and for the purpose set forth.

Forging the guard finger from a single piece of metal, without a weld and cutting a slot for the knife to work through, substantially as and for the purposes set forth.

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54,703.—Boiler Thimble—George W. Duvall, Norfolk, Va.:

I claim a cylinder of iron in two sections with scrol'-shaped head and grooves as described in combination with the wedges, A, constructed and operated substantially as described

57,704.—Spinning Machine.—William Eberhard, Sharon Center, Ohio:

I claim the arrangement of the fuse and the devices connected with it and the crank shaft and the means connected therewith, for giving the backward and forward motion to the carriage as herein recited.

The arrangement of the lever, b', and the means connected therewith, for producing the change of gear and making and breaking the connection of the feeding apparatus with the carriage, as herein described.

Third, Combining the spring, m', with the spool and spindle, as and for the purposes herein set forth.

54,705—Smoke-consuming Heater.—George W. Fair, Dayton, Ohio:

First, I claim the fire-clay arch, A, with its long aperture, B, at top, as arranged and combined with its fire place, C, and inside flue, G, as herein described.

Second, I also claim the outside flue, H, constructed of sheet iron or metal around the arch, as arranged and combined with the dome, J, as herein described, and for the purposes set forth.

54,706.—Lifting Jack.—Daniel Fasig.—Rowesburg, Ohio:

I claim the combination of the standard, A, with the sliding rack bar, C, lever, D, and adjustable arm, J, when the latter acts as a fulcrum and detent, its teeth, e e, engaging in corresponding recesses, h, in said frame, A, all co-operating and constructed substantially as described, and for the purposes set forth.

54,707—Beer Faucet.—Joseph Firmenich, Buffalo, N. Y.:

I claim the plug of a faucet made wholly of rubber, partially elastic, when arranged and combined with the wooden wrench, opera ing substantially as and for the purposes herein set forth.

54,708.—Liquid Cooler. Adelbert Fisher, New York City:

I claim the movable heads, E, with annular recesses, A, in combination with the center bolt, F, annular cylinder, A, and vessel, B, all constructed and operating substantially as and for the purpose described.

[This improvement consists in providing the annular cylinder with movable heads which are held in position by a central bolt, the joint being rendered tight by suitable packing in such a manner that by uncovering the central bolt, the heads are released and access can be had to the interior of the annular cylinder or cylinders for the purpose of cleaning.]

54,709.—Saw Filing Machine.—Charles P. Frazer, Allowaystown, N. J., and C. C. Hinchman, Clarksboro', N. J.:

I claim the combination of the reversible swivel plate, G, file carrier, D, groove, M, tongue, O, and clamp, B, the whole being constructed and arranged in relation to each other, substantially as described, and for the purposes specified.

54,710.—Mode of Receiving and Delivering Mail Bags Upon Railroad Cars.—J. Fredenburgh and G. A. Davidson, Greene, N. Y.:

First, We claim the scoop or hoppers, B and C, constructed and arranged in the manner described, the same being seamed to the mail car and also one placed upon the front edge of each mail station platform, to be operated by passing cars, herein set forth.

Second, We claim the method of tossing or throwing the mail bags from the car to the station platform, and from the platform to the car, at the same time, by the means employed, substantially as herein described, for the purpose specified.

54,711.—Garden Digger.—Roscoe R. Frohock, Boston, Mass.:

I claim a digging implement constructed with two blades, a and b, arranged to operate together, substantially as described.

54,712.—Telegraph Post.—William J. Fryer, Jr., New York City. Antedated May 1, 1866:

I claim the flanged tubular telegraph post made of corrugated sheet iron, B, resting upon a base, A, radiating arms, D, and cap, C, all constructed substantially in the manner and for the purpose herein specified.

54,713.—Fire Screen.—H. P. Gengembre, Pittsburgh, Pa.:

First, I claim the combination of the flexible screen, V, mounted in the case, T, and supported by the piece, P, arms, M and K, and the clamp, E, for the purpose specified.

Second, The combination of the oscillating disk, G, washers, I I', and rivet, H.

Third, The arms, K and M, articulated together and also with the clamp, E, for the purpose specified.

Fourth, The combination of the piece, P, with its pulley, p p balls S, and cords, R R.

Fifth, The combination of the case, T, with its roller, X, and pins, Y Y, as described and for the purpose specified.

54,714.—Mechanism for Adjustment of Head Lights.—Charles D. Gibson, New York City:

First, I claim movable locomotive head light when its adjustment to any given angle is placed under the control of the engineer or driver, substantially in the manner and for the purpose herein described.

Second, I also claim the central plate, B, and support, C', when combined with lever, D, arm, F, elbow joint, E, and shaft, F, or their equivalents, substantially in the manner and for the purpose herein described.

54,715.—Tension Pulley for Sewing Machines.—Julien C. Girardin, Philadelphia, Pa.:

I claim the use of screws in place of rivets for fixing together the plates composing the tension pulley of a sewing machine, they having either ordinary heads or the same with a segment cut away, for the purposes hereinafter described.

54,716.—Safety Valve for Steam Generator.—Virgil D. Green, Watertown, Wis.:

I claim the combination of the cup-shaped or hollow valve, D, steam passage, I, and weighted valve, N, and boiler valve, K, connected to a common stem, L, when arranged so as to operate together, substantially as herein described, and for the purpose specified.

[The object of this invention is to enable a large safety valve to be used for the escape of steam from a boiler, while at the same time the use of a long lever, or heavy weights or rigid and stiff springs are entirely obviated.]

54,717.—Lime Kiln.—Powell Griscom, and J. H. Miller, Baltimore, Md.:

We claim the arrangement of the draw pits and furnaces on opposite sides as described, and secondly, the arrangement of the furnaces in respect of the kilns, so that the furnaces with the exception of those at the ends, shall communicate with the kiln at each side.

[This invention relating to lime kilns, consists in putting the drawpits and furnaces on opposite sides, and arranging the furnaces so that with the exception of those at the ends, they communicate with the kiln.]

54,718.—Wardrobe, Bureau, Desk, Washstand and Bed Combined.—E. Hambujer, Detroit, Mich.:

I claim, First, A combined wardrobe, bureau, writing desk, washstand and bed, when arranged substantially as set forth.

Second, In the folding bed, I P, I claim the middle legs, K, formed with a notch, as described and hinged to one section, I, in combination with a projection upon the end of the frame, I, substantially as and for the purpose set forth.

54,719.—Pump.—Thomas Hansbrow, Sacramento, Cal.:

I claim the arrangement of the air vessel, G, nozzle, d, side pipe, C, valve chest, F, valves, b b' c c', passage, D, and cylinder, A, operating in the manner and for the purpose herein described.

[This invention relates to a new and useful improvement in upright reciprocating pumps, and it consists in running the suction pipe up through the pipe communicating with the cylinder, whereby the pump cylinder cannot lose its "priming;" that is to say, said cylinder will be kept supplied with water even though the valves should leak.]

54,720.—Paper Collar.—William B. Harris, Springfield, Mass.:

I claim the notches or slits in the ends of the collar, and the lengthened button holes or slits, arranged in such a manner that when the notches are placed in the lengthened button holes or slits, they will prevent the upper edge of the collar from turning in toward the neck, and by slipping along the button holes, allow the collar to adjust itself exactly to the neck, as herein described

54,721.—Cooking Stove.—Daniel Heilig, Chicago, Ill.:

I claim the arrangement and combination of the oven, D, with the fire box, P, when constructed as described, and used for the purpose set forth.

54,722.—Steam Gage Cock.—Frederick Henke, Scranton, Pa.:

I claim a gage cock framed by combining the piston, I, with the arm, J, valve, D, and spring, G, substantially as described and for the purpose set forth.

[The object of this invention is to furnish a gage cock for steam boilers and similar uses, which will be easily operated, will be steam and water tight, will not be liable to get out of order, will be subject to little wear, and which can have the piston removed for repacking or cleaning out the gage while the gage is attached to the boiler and the boiler in operation; and consists in combining a packed piston or valve pusher with the lever and valve as herein after more fully described.]

54,723.—Hay Loader.—S. R. Higgins, Parma, Mich.:

First, I claim the rake, I, connected by joints to arms, J J, which are secured by joints to a turn table, D, on a mounted frame and arranged with a hoisting tackle and upright on the turn table to operate in the manner substantially as and for the purpose set forth.

Second, The sliding plate, K, provided with an oblong slot, g, through which the hoisting rope, H, passes, and connected with the lever, B, of the arbor of the caster pulley, b, to serve as a clutch for the hoisting rope, substantially as described.

[This invention relates to a new and improved machine for loading wagons with hay or grain, and it consists in a novel construction of a rake and the application of the same to a mounted frame; in connection with a hoisting and lowering tackle, tripping device, clutch, and turn-table, whereby hay or grain may be taken up either from cocks or windrows and deposited upon the wagon or cart with the greatest facility.]

54,724.—Potato Harvester.—Joseph K. Hill, Xenia Ohio:

First, I claim the double or compound roller, A A', constructed and operating as described, in connection with the fifth wheel, for the purpose set forth.

Second, The pivoted and adjustable plow and cutting coulter, constructed and operating substantially as described, and for the purposes set forth.

Third, Operating the digging shovel, H, through the leverage frame, J J K.

Fourth, Constructing the toothed cylinder, I, of sections or disks, with recesses, h', to hold the teeth, as described for the purposes set forth.

54,725.—Grate.—Charles Hives, Salem, N. J.:

I claim the raised, sloped, annular portion, d', on the rim of the grate, D, and the corresponding annular groove, c c2, in the bottom edge of the cylinder, C, the said parts being arranged together, so as to operate substantially as and for the purpose described.

54,726.—Machinery for Separating Metals from Ores.—John A. Hitchings, Denver City, Colorado:

I claim, First, The arrangement of the mortars, rounded stamps, and slotted connecting openings, substantially as and for the purpose set forth.

Second, The arrangement as a sequence to the subject matter of the first claim, of the rollers, N, in the trough for the further comminution of the ore received from the stamps.

Third, A basin-shaped revolving roasting plate, Fig. 4, provided with scrapers as described, and with a vessel containing salts of soda, alum or potash, which are intermingled with the ground ore.

Fourth, The arrangement, with the revolving roaster, of the cold water tank which receives the heated ore therefrom, as described.

Fifth, The arrangement of the roasting plate, cold water bath, amalgamator, and crastra, as described.

Sixth, The quicksilver-coated copper amalgamator, acting as a final means of arresting non-mercurialized metals, arranged and operated as described.

Seventh, The condenser arranged as described, consisting of the flue, Z, passing through the water chamber, the discharge pipe, h, and the chamber, b, the shower bath, c, and exit flue, f.

54,727.—Clothes Drier.—M. D. Hotchkiss, Sheboygan Falls, Wis.:

I claim in combination with the swinging arms of a rack for holding clothes while drying, the supporting arc, D, substantially as set forth.

In combination with the swinging arms of a rack for holding clothes while drying, the spring, E, substantially as and for the purpose set forth.

54,728.—Bayonet Attachment.—Charles Howard, New York City:

First, I claim the groove around the center of the hilt or tubular part of the bayonet with a slot cut through for the purpose of supporting and keeping in place an open spring ring fastener.

Second, The open spring ring, a segment of which is made thick so as to drop into a notch of the barrel to fasten the bayonet, for the purpose substantially as above set forth.

54,729.—Tethering Halter Apparatus.—Eldridge Howe, Marlboro', Mass. Antedated April 13, 1866:

I claim the tethering apparatus, substantially as described, as composed of the halter and the series of cylinders as applied together, as and for the purpose specified.

54,730.—Steam Generator.—Dewitt C. Howell, Goshen N. Y.:

First, I claim the conductor, G G' g g', constructed and connected with the fire box and arranged with reference to the fire box and surrounding portion of the boiler, substantially as herein described for the purpose set forth.

Second, The fuel reservoir, D, piston, D', and slide valve, M, applied in combination with the grate, C, or fire bed, substantially as herein specified.

Third, The pipe, P, and valve, v', applied substantially as and for the purpose herein set forth.

54,731.—Steam Engine.—Lafayette Huntoon, Milford, Mass.:

I claim as my invention the improved steam engine constructed substantially in manner and so to operate as hereinbefore described, that is to say, as composed of the main and expansion cylinder, A B, of different capacities or lengths and diameters as stated, their separate pistons, C D, piston rods E F, connecting rods, G, H, and cranks, I K, steam chests, V W, valves, T U, and steam passages and valve-operating mechanism arranged together, and applied to a driving shaft, substantially as explained.

54,732.—Drawing Roller.—Daniel Hussey, Nashua, N. H.:

I claim the combination of the gear, c d, or their equivalents, with the tubular top roller, A, the weight shaft, a, and the bottom roller, B, or the shaft, b, thereof, the whole being substantially as and for the purpose set forth.

I also claim the combination of the weight-bearing sleeve, C', with the shaft, a, and the tubular top rollers, A A, thereof.

I also claim the arrangement of the sleeve C', with respect to each of the top rollers, viz, so that one shall extend into the other a short distance and be encompassed by it, substantially as and for the purpose as specified.

54,733.—Screw for Stools, Etc.—William Allen Ingalls, Chicago, Ill.:

I claim the above-described screw, as an article of manufacture.

54,734.—Brick Mold.—Thomas James, Baltimore, Md.:

I claim a mold for forming bricks or other articles of clay, made wholly or in part of vitreous material, or faced or lined with vitreous material, for the purposes set forth.

[This invention consists in a glass or vitreous face or lining, applied to a brick mold or piston.]

54,735.—Crimping Machine.—John P. Jamison, New York City:

First, I claim the four springs, D and E, made of metal or other substances, adjusted, arranged and secured to the cross piece, C', in the manner herein above substantially set forth and described.

Second, The four brass jaws or stretchers marked, E, in combination with said four springs, D and E, secured to cross bar, C, as regulating and providing for the self-adjustment thereof, as herein shown and described.

54,736.—Button.—John M. Johnson, New York City:

I claim the barbed piercing stud, C, in combination with the rigid tubular shank of the button, A, and the spring, D, and operating in the manner and for the purpose herein specified.

54,737.—Bed Bottom.—Warren Jones, Berlin, Wis.:

I claim the combination of the braces, E, with the springs C' C'1 C'2, slat, B, bars, D, and frame, the whole being arranged to operate substantially in the manner and for the purpose set forth

[The nature of this invention consists in the employment of braces which in addition to their function of preventing the deflection or displacement of the spiral springs, are adapted in themselves to constitute yielding supports, so that while they fill an important office in conjunction with the springs, they have the special and independent character of elastic, yielding bearings.]

54,738.—Die for Heading Bolts.—Charles Kane, Pittsburgh, Pa.:

I claim the heading or staving die, M, when its cross section is a parallelogram in combination and made to correspond with and fit a rectangular space left between the pressing dies, the dimension of which is greater from ledge to ledge, as above described.

54,739.—Sand Pump.—J. B. Kibler, Girard, Pa.:

First, I claim the movable valve seat, J, in the bottom of a sand pump, substantially as described.

Second, I also claim the stopper or plug valve, c', in the top of the pump, in combination with a spindle extending downwards below the end of the supports of the pump, substantially as described.

[This invention consists in a novel construction of a sand pump whereby its operation is rendered automatic.]

54,740.—Handle for Coffee, Spice, and Other Small Mills.—Jacob Kinser, Pittsburgh, Pa.:

I claim the cast iron handles for coffee, spice, and other small mills, substantially as shown and described, as an article of manufacture.

54,741.—Wash Basin.—Johann Christian Knoepke, Philadelphia, Pa.:

I claim as a new article of manufacture, a tin wash bowl made of a combination of the bowl, B, curved strip, C, and ring, E, in the manner and for the purpose described.

54,742.—Loom for Weaving Tapes, Ribbons, Etc.—Lucius J. Knowles, Warren, Mass.:

I claim a combination composed not only of the straps, e e, and their guide wheels as applied to the lay and its rack, substantially as described, but of the crank, n, the shaft o and the bevel gears, t u, or their mechanical equivalent or equivalents, operated by the cranked shaft of the lay.

I also claim the straps, e e, and the guide wheels, f f g g, arranged and combined together, and with the lay and the rack, substantially in manner, or so as to be operated by a crank or its equivalent, as specified.

I also claim the arrangement of the shaft, o, and its crank, n, and gear, t, with the crank shaft, c, and its pinion, u, and the straps, e e, applied to the lay and its rack, substantially as specified.

54,743.—Breech-loading Fire-arm.—T. T. S. Laidley, U. S. Army, and C. A. Emery, Springfield, Mass.:

We claim, First, Locking the movable breech piece, by means of a piece independent and separate from the hammer or tumbler, but moving on the same axis, and the same operated or brought into place, as soon as the breech piece is closed, irrespective of the extent to which it may have been opened.

Second, The arrangement of a cam on the same axis of the breech piece, for the purpose of throwing back the locking piece, so that by means of a stop on the cam, the breech piece may be opened by the simple motion of the said cam.

Third, The arrangement of a pawl attached to the locking brace and operated by the hammer or tumbler for the purpose of throwing back the said locking piece. The whole arranged and operated substantially and for the purpose specified.

54,744.—Breech-loading Fire-arm.—James Lee, Milwaukee, Wis.:

First, I claim the breech block, C, provided with the grooves, e and f, substantially as, and for the purpose set forth.

Second, I claim providing the lever, D, with the studs, m and l, to operate in connection with the breech block, C, as shown and described.

Third, I claim the lever, D, having its front end provided with the lip or hook, o, and arranged to operate within the chamber of the gun, substantially as, and for the purpose set forth.

54,745.—Cow and Sheep Rack.—Rodman Lovett, Canton, Ohio:

First, I claim the section A A', hay racks, B B, revolving troughs, D d, and guide board, C, arranged substantially as, and for the purposes set forth.

Second, The adjustable hay racks, B B, when arranged and used for the purposes set forth.

Third, The adjustable trough, F, in combination with the sections, A A', when used as, and for the purposes specified.

54,746.—Evaporating Solutions of Salt, Sugar, Etc.—Osborne Macdaniel, New York City:

First, I claim in connection with evaporating vats the vertical sliding and folding frames on which are fastened cloths, mats, or boards, so arranged as to fold over and upon each other at the bottom of the vat when the frames are lowered, and to hang in the air when the frames are raised, substantially as, and for the purpose herein described.

Second, I claim the elevated distributing troughs, o o, and the return troughs, v v, in combination with the tanks, D and E, and the evaporating apparatus suspended in the vats, B B, for the purpose, and substantially as herein described

54,747.—Dumping Wagon.—A. D. Manley, Washington, Mich.:

I claim the sliding bar R, with its pins, w, operating in combination with the spring bars, m, and the swinging boxes, G H I, for joint or independent action in the manner, and for the purpose herein specified.

[This invention particularly relates to the box or body of a wagon, and it consists in so dividing the same into two or more sections or parts, and arranging them with regard to each other, in such a manner that either one or all of the sections can be so operated as to "dump" such portion of the load as may be contained in its various sections at pleasure, without necessarily bringing the wagon to a stop, which result can be accomplished with the utmost ease by the driver of the wagon, without moving from his seat, and the wagon body similarly replaced or reset, after any one or more of its section have been dumped.]

54,748.—Mode of Extinguishing Fire.—W. C. Marshall, New York City

I claim the arrangement of several series of perforated pipes, a b c (one or more for each floor of a building), in combination with nipples, a' b' c', situated on the outside of the building, and each communicating with a distinct series of pipes, substantially as, and for the purposes set forth.

[This invention consists in arranging in the interior of building and along the ceilings several series of perforated pipes, one or more for each floor or story, in combination with nipples, whic

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are situated on the outside of the building and each of which communicates with a distinct series of pipes in such a manner that in case of fire in the building, a hose can be readily attached to the proper nipple, and the floor on which the fire originated can be flooded with water, and the fire extinguished before it is allowed to make much headway.]

54,749.—Tenoning Machine.—Lawrence Mason, Turin, N. Y.:

I claim the arrangement of the vertically moving frame, B* B*, adjustable bars, D* D*, and springs, E* E*, saws, F* F*, cutters, G* G*, ganged by means of the tappets i* i*, and arms, N*, operating substantially as described and represented.

54,750.—Machine for Boring Wagon Hubs.—Lawrence Mason, Turin, N. Y.:

First. I claim the arrangement in the hub-boring machine of the adjustable cutter mandrel, B, with its plate, S, and set screw, T, and the clamping and centering plates, D D', with their triangular openings, F E, constructed and operated as described.

Second, I claim the combination and arrangement of the frame, M, arbor, K, slotted dog, N, arm, P, collar, Q, disk, R, shafts, B, and adjustable plates, D D', substantially as and for the purpose described.

54,751.—Cultivator.—William McCormick, Muscatine, Iowa:

First I claim the cast iron standards, Z, provided at their upper ends with lips, i, to fit over the upper and lower edges of the plow beams, I, in order to avoid the use of the braces to retain the standards in position, substantially as set forth.

Second, The arrangement of the plow beams, I, as shown, to wit, the rear ends being provided with rods, J, to fit into staples or guides, K, at the lower parts of uprights, G, at the rear of the frame A, and their front ends connected by chains, R, to uprights, G, which are attached by universal joints, g, to the front part of the frame, A, the uprights, G, passing down between rollers, M, and the front bent parts, a', of one of the clevis, L, of each beam, substantially as and for the purpose specified.

Third, The attaching of the doubletree, Q, to the front ends of the beams, I, when said beams are connected to the bar, I*, through the medium of the uprights, O, in said beams, in the manner substantially as set forth.

Fourth, The arrangement of the treadles, T T, with the beams, I I, and lever, W, substantially as and for the purpose specified.

54,752.—Brick Machine.—A. R. McNair, New York City:

First, I claim feeding the molds to a brick machine in a pile from the front side, substantially as specified.

Second, The eccentric wheels, F and L L, in combination with shaft, D, levers and hinges, O, presser, H sliding boards, E and E, as described, constructed, and arranged, substantially as and for the purpose set forth.

54,753.—Axle Box.—Joseph Montgomery, Harrisburg, Penn.:

First, I claim the journal box, C, arranged and constructed, substantially as described and for the purpose set forth.

Second, The lid, A hinged low and secured by handle, B, and jamming cam, b constructed and operating substantially as described and for the purpose set forth.

Third, The loose or hinged rack frame, C', inside of box, constructed and operating, substantially as described and for the purpose set forth,

54,754.—Portable Fence.—E. D. Montrose, Nashua, Iowa:

I claim a portable fence constructed of two or more parallel chains, A A, composed of links, a, bent in the form and around the pickets B, in the manner substantially as herein set forth.

54,755.—Carriage Seat.—F. B. Morse, Milwaukee, Wis:

I claim the lever fastenings, G, when used in combination with the seat rail posts, F, for the purpose specified and arranged, and operating substantially as described.

[The object of this invention is to so attach the lazy-back and buggy tops to the seats of carriages, that when desired they can be readily and easily detached therefrom or secured thereon, and thus either one or the other used at pleasure, the mode of attachment being simple, light, but strong, and costing but little to manufacture.]

54,756.—Plow.—John Mott, Danville, California:

I claim First, As a new invention, the use of a double plow revolving upon a horizontal axis, L, the two plows being placed one over the other in an invested position, substantially as described and for the purpose set forth.

Second, I claim the clasps, M and N, for hinging the main rod, L, to the standards, C and I, and the adjustment with washers (or their equivalents) of the clasps, N, for turning the plow more or less to land, substantially as described.

Third, I claim the set screws, s s', placed in the upper end of the standard of the plows for steadying them and keeping off the land side from the standard, J', substantially as described,

54,757—Superheating Apparatus.—Isaac Newton, New York City:

I claim, First, The arrangement of a superheating apparatus composed of a system of tubes and a circulating chamber within an enlarged casing or box, N O P Q, in relation to the outlet of the boiler and the base of the chimney, substantially as and for the purpose specified.

Second, Bracing the circulating chambers, A B C D, by securing one or more of the inner tubes to their corresponding outer ones at their ends, H F, and their reverse ends, respectively to the side, C D, and dividing plate, I K, of the circulating chamber, substantially as described.

Third, The arrangement of the superheating tubes within the casing, N O P Q, in relation to the circulating chamber and to a door, A' B', in the said casing, substantially as herein specified, to provide for the removal and replacement of any of the said tubes.

54,758.—Machine for Making Eaves Troughs.—O. W. Noble, Darlington, Wis.:

I claim, First, The slide, E, in combination with the roller, B, arranged and operating substantially as specified.

Second, The forming board, F, in combination with the treadle, G, and roller, B, substantially as and for the purpose specified.

Third, The combination and arrangement of the roller, provided with a permanent rib, D, and slide, E, with the forming board, F, and treadle, G, substantially as specified.

[This invention relates to a machine for forming sheet metal eaves troughs whereon the roller is provided with a slide secured to a permanent rib therein for clamping the sheet of metal while being formed, which is used in combination with a forming board operated by a treadle, all being suitably arranged so that the operator can put in the sheets of metal, operate the machine and remove the formed trough without a change of position.]

54,759.—Pentographic Machine.—Edmund Oldham, Brooklyn, N. Y.:

I claim in pentographic machines the use of an eye glass with a speck or dot on its surface for the purpose of tracing outlines of plane or other surfaces, substantially as above set forth.

Second, I also claim the means above described for giving independent movements to the diamond pointer, to wit: the bar, E, the fusee pinion, F, and its shaft, G, and the toothed wheel, H2, on which the carriage H, rests substantially as above set forth.

Third, I also claim the ruling devices, R S T, constructed and operated substantially as set forth.

54,760.—Chuck.—L, H. Olmsted, Stamford, Conn.:

I claim making a chuck, substantially as shown and described,

54,761.—Egg Beater.—S. B. Pangborn and G. H. Griffin Boston, Mass.:

We claim the improved egg beater, as composed of the vessel or pot, A, the shaft, e, and its wings or beaters, g g g, and the arms or projection, e, and the weight, f, fixed to such arm the whole being arranged in manner and as to operate substantially as and for the purposes as hereinbefore specified.

We also claim the combination of the centrifugal guard, h, with the vessel, A, with and its cover, and with the shaft, its bearers and the arm and weight applied to such vessel, they being substantially as specified.

54,762.—Chair.—V. P. Parkhurst, Templeton, Mass.:

I claim the combination of the plate, E, pivots, a, ferrules, F, caps, G, and pins, g, arranged relatively with the back, D, and posts, C, of the chair, A, and operating in the manner and for the purpose herein specified.

[This invention consists in so attaching or hanging the backs of chairs and other similar seats to the posts that they will adjust themselves to the person sitting in the chair, supporting both the shoulders and lower part of the back, whatever position the sitter may assume; and, also, in so hanging the said back that when the person rises from the chair, the back will resume its original or vertical position between its posts or supports, without the aid of springs or any other additional devices.]

54,763.—Cultivator.—Edward Parmele and R. N. Patterson, Davenport, Iowa:

First, We claim applying shovel standards to a carriage in such manner that they are allowed to rise or fall bodily or independently of each other and also of being moved laterally together by the feet of the attendant, substantially as described.

Second, The slotted shovel standards, D D, in combination with the treadles, r r, and the driver's seat, substantially as described.

Third, Connecting the standards, D D, to the roller, e, in such manner that their lower ends can be swung forward and upward in combination with contrivances for allowing said shovel standards to be adjusted laterally, and also moved up and down in a direction with their length, substantially as described.

Fourth, So constructing the two treadles, r r, that each one serves as a lever, and also as a means by which both standards can be moved simultaneously to the right or to the left, substantially as scribed.

54,764.—Clothes Wringer.—James N. Pease, Panama, N. Y.:

I claim the improved method of gearing wringer rolls by doubling or multiplying the toothed wheels in the manner hereinbefore described, that is to say, by the employment upon each of the shafts geared together of two or more sets of teeth of like number, configuration or construction, each set being situate in different planes but in such a fixed relation in respect to the other set or sets, that the spaces between the teeth of either set shall be equally divided by the teeth of the other.

54,765.—Broom Head.—Daniel Peters, Eaton, Ohio:

I claim the tube, E, which forms a guide and socket for the bolt, D, in its described combination with and relation to the said bolt, the wrapper, B, the handle, A, and bars, F F.

54,766.—Water Closet.—Oliver S. Pettit, Brooklyn, N. Y.:

I claim the combination of the valve, H, rod, I, and lever, J, with the discharge pipe, G, and cover, B, of a water closet, substantially as described and for the purpose set for h.

[This invention has for its object to so improve the construction of water closets, that the unpleasant effluvia may not ascend through the discharge pipe and be disseminated through the building; and it consists in combining with the discharge pipe and with the seat or cover of the pan, a valve, opening automatically to permit the escape of the contents of the pan, and closing when the pressure upon the cover is removed.]

54,767.—Ladder.—Barton Pickering, Dayton, Ohio:

I claim the platform C, provided with catches, u u, the orifices o, and bent round, f', in combination with the ladder, A B, having projections on the part, A, substantially as described and for the purpose set forth.

54,768.—Safety Valve.—Alexander Pollock, New York City:

First, I claim the valve chest, C, and its two valve seats, e f, the double puppet valve, E F, and the outlet, D, arranged in relation with each other and with the steam box A, communicating with the steam space of the boiler, substantially as and for the purpose herein specified.

Second, The arrangement of the safety valve, the weight, H, or its equivalent, and the lever, J, through which the weight or spring acts upon the valve all within a steam box A, which is alway in communication with the boiler, substantially as herein described.

Third, The tripping lever, M, outside of the steam box, A, and the rod, L, applied in combination with loaded rod, I, connected with the valve lever, J, within the steam box, A, substantially as herein described, whereby the lifting or tripping of the inclosed valve for blowing off steam is provided for, without permitting the load on the said valve to be increased, or the said valve to be secured in a closed condition.

Fourth, The arrangement of the valve chest, C, attached to steam box, A, by the removable plate, D', whereby the removal of the pin, n, the valves and valve chest lever, J, may be removed from the steam box with the said plate, D.

Fifth, The bar, Q, staple or staples, R, pin or pins, i, and seal or seals j, applied and arranged in relation with each other and with the steam box, A, and door, P, substantially as and for the purpose herein set forth.

Sixth, The double puppet valve provided between its heads with a chamber, g, which is open to the steam space in which the valve chest is situated, substantially as and for the purpose herein specified.

54,769.—Churn Dasher.—G. H. Poole, New York City:

First, I claim the dasher, B, constructed substantially as described and for the purpose set forth.

Second, The combination with the dasher of the disk or fan, D, substantially as described and for the purpose set forth.

Third, The combination of the double cover, E F, constructed as described with the dasher and with the churn, substantially as and for the purpose set forth.

Fourth, The combination of the crank wheel, I, arm, H, and guides, N, with each other, with the dasher B, cover, G E F, and frame, J, substantially as described and for the purpose set forth.

[The object of this invention is to furnish a churn by means of which the globules in the cream which contain the butter may be gradually and quietly broken in contact with the air, thereby improving the quality and increasing the quantity of the butter produced. And it consists, principally, in the novel construction of the dasher, which is made by attaching three or more whorls of radial arms to the lower part of the dasher staff. To the upper and under sides of each of these arms is attached half-cone shaped cups or scoops, which, as the dasher rises, carry up and project through the air quantities of the cream, and as the dasher descends, carry down with them air to be distributed through the cream.]

54,770.—Railroad Switch.—Thomas B. Purves, Green Bush, N. Y.:

I claim the construction of a portable switch, for the purpose of placing cars upon a railroad track by the combination of the bar, a b c, secured as described to the rail, with a movable limb, c f g', formed as shown and hinged or pivoted to it over the center of the rail, substantially as described and for the purpose set forth in this specification.

54,771.—Purifying Bone Black—Thomas H. Quick, New York City:

First, I claim the flue, G, for receiving the descending currents of animal coal or bone black, constructed substantially as and for the purpose above described, with the diaphragm, B, and shelf, C, in combination with the feed pipe, A.

Second, I claim the combination of the flue, G, with a Hancock steam blower, arranged substantially as and for the purpose above described.

54,772.—Portable Fence—Jacob Reedy, Toledo, Iowa:

I claim constructing the posts, A, with a double riveted mortise and the boards, B, with corresponding notches in their lower sides, the fencing secured by such notches and by keys driven above the boards, substantially in the manner set forth.

54,773.—Ladies' Paper Undersleeves.—Helen M. Remington, Springfield, Mass.:

First, I claim as a new article of manufacture, a paper undersleeve, substantially as described.

Second, I claim the material composed of two thicknesses of paper with an oily substance to render it water proof and a suitable preparation to prevent this oil from striking through to the outside, substantially as described.

54,774.—Mode of Attaching Circular Saws to their Arbors.—Albert L. Rice, Worcester, Mass.:

First, I claim the improved mode herein described of attaching and adjusting circular saws to their arbors by the combination with the stationary and movable recessed collars as herein described, of a conical bush, sliding on the saw arbor, and fitting in the recess formed in the movable collar under such an arrangement that the saw may be simultaneously adjusted, and secured on its arbor, as shown and set forth.

Second, In combination with the stationary and movable collar and conical bush fitting in a recess in the movable collar as described, I claim the employment of a rubber or other elastic packing or washer, as and for the purpose herein set forth.

54,775.—Axle Box.—William F. Rippon, Providence, R. I.:

I claim the independent oil reservoir, A, provided with a filter, c, as described in combination with the journal bearing, D, substantially as described.

54,776.—Egg Beater.—Alexander M. Robinson, Boston, Mass.:

I claim the funnel-shaped ends in combination with the ribs soldered to the sides of the case.

54,777.—Head Block for Saw Mills.—George W. Rodebaugh, Toledo, Ohio:

First, I claim setting the log to the saw at either end or at both, simultaneously, by means of the independent shafts, E E, when operated by compound cog wheel, I, and adjustable pinions, K K, substantially in the manner and for the purposes herein specified.

Second, I claim the construction of the dog, consisting of the bit, a, attached to a shank, a4, which fits and slides within the vertical groove of the knee, substantially as described and represented.

Third, I claim operating the pivoted dog, a', by means of the lever, b, and pins, e e, as and for the purposes set forth.

54,778.—Extension Fruit Ladder.—Artemas Rogers, Painesville, Ohio:

I claim the lever, I, brace, D, in combination with the ladder, A, and B, hops, C', arranged and operated in the manner and for the purpose set forth.

54,779.—Bed Bottom.—Jonas Rouse, Dowagiac, Mich.:

I claim the combination of the slats, C', and secondary slat, D, arranged to operate substantially as specified.

[This invention consists in the combination, with the slats of a bedstead of a secondary slat, in such manner that the secondary slat acts as a spring, giving to the slats proper the desired springing motion, whereby a cheap and easy spring bed bottom is obtained.]

54,780.—Steam Generator.—Stephen P. Ruggles, Boston, Mass.:

I claim combining with an open boiler or reservoir of water, a steam generator within said boiler, and at or near the bottom of the column of water therein, substantially as and for the purpose herein described.

54,781.—Washing Machine.—William H. Sargent, Weymouth, Mass.:

I claim the combination and arrangement of the stationary rubber, f, the friction rollers, e e, and their carrying frame, A, being constructed with its two opposite sides, b b, inclined toward the handle, and made with openings through its ends to enable the water and saponaceous matter to flow freely through them into and out of the case while the machine may be in use.

54,782.—Attaching Props to Carriage Bows.—Leonard Sawyer, South Amesbury, Mass.:

I claim the plate, B provided with the square tubular projection, C, and the prop or arm, D, provided with a screw to fit into an internal screw thread in the projection, c, in combination with the collar, F, having a square interior and fitted on a square port on on the prop or arm, and on the projection, c, substantially as and for the purpose specified.

54,783.—Device for Shooting Gravel at Cows upon Railroad Tracks.—Stephen Scolton, Richmond, Ind.:

I claim the construction and operation of the valve, c, in combination with the hopper, A, and tube, B, or their equivalents, for the purpose described.

54,784.—Harvester.—Jacob Seibel, Manlius, Ill. Antedated May 1, 1866:

First, I claim the arrangement of the jointed shaft, H, with the two shafts J N, with their attachments, operating substantially as and for the purposes herein specified and shown.

Second, I claim suspending the platform upon the main frame by means of the bar, R, and the bent support, W, attached to the platform, all being arranged and operating as and for the purposes specified and shown.

54,785.—Hoop Skirt.—Permelia E. Sheffield, Pontiac, Mich.:

I claim hoop skirts of steel wire, having an apron, A, extending down the front of the skirt covering the wires, substantially as and for the purpose set forth,

54,786.—Ribbed Metallic Bar.—John Y. Smith, Alexandria, Va., assignor to himself and Herman Haupt, Philadelphia, Pa.:

I claim the manufacture of the metallic triple-ribbed bar, in the manner and by the means substantially as herein described.

54,787.—Mail Pouch or Box.—Marshall Smith, St. Louis, Mo.:

First. I claim the combination of the box, C D, with the toothed ways, e f, and sliding follower or compressor, A, or corrugated ways, h, and followers or compressor, B, or their equivalent devices, when employed as and for the purpose set forth.

Second, I claim attaching the reversible label, M, to the box, C, substantially as described.

Third, I claim interposing a rubber or any other suitable packing, x, between the different parts of wooden boxes, so as to make them water-tight, for the conveyance of mails.

Fourth, I claim a box fitted with internal partitions and followers, arranged to separate parcels of mail matter, while being conveyed in the same box, the whole used as a package for inclosing mails for and in transportation, substantially as set forth.

54,788.—Flour Sifter.—Edward Spencer, Philadelphia, Pa.:

I claim the employment of the balls, E, in combination with the rotary cylindrical sieve, A B, suspended in a suitable case, C D, the whole being constructed and arranged together, so as to operate substantially as and for the purpose described.

54,789.—Harvester Rake.—Ara D. Sprague and Asbury Dockum, Caledonia, Minn.:

First, We claim the combination and arrangement of the elevated rake head, G F, and arm, H, with the sheave, J, constructed and operating substantially as and for the purposes herein delineated and shown.

Second, We claim in combination with a slotted rake head, F G, the employment of the stationary fingers, L, arranged and operating as and for the purposes set forth and shown.

Third, We claim the adjustable teeth, c, when constructed, arranged and operating as and for the purposes shown and described.

54,790.—Combined Harrow and Roller.—John Steiner and John P. Miller, Harrisburgh, Ohio:

First, We claim the drag bar, A, constructed and arranged with reference to the harrow, B, substantially as described and for the purposes specified.

Second, The combination of the harrow, B, drag bar, A, the wheels D D E E, and the roller, C, in the manner substantially as described, and for the purposes specified.

54,791.—Sorghum Stripper.—A. P. Stephenson, Equality, Ill.:

I claim a tool consiructed substantially as described, for topping, stripping, and cutting sorghum, and other canes.

54,792.—Water Wheel.—Christopher C. Stillman, Westerly, R. I.:

First, Furnishing every one of the pitches of a turbine wheel with a separate gate operated substantially as and for the purpose herein specified.

Second, A combination with a series of gates applied one to each of the pitches of a turbine water wheel, I claim a cam so applied

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open and close the said gates in pairs successively, all around the wheel one on each side of the center thereof, substantially as herein described.

Third, I claim the combination of the annular grooved cam, E, the circular slotted guide frame, D, and the stems of the gates, substantially as and for the purpose herein set forth.

Fourth, The springs, t, applied in combination with the gates and their stems, substantially as and for the purpose herein described.

54,793.—Weather Strip for Doors.—A. E. Strobel, New York City:

I claim the plate, D, attached to the door and operating as a weather strip by projecting into and receding from the groove, c, with the movement of the belt, I, in the act of latching or unlatching the door, in combination with suitable means for locking the plate within the groove, substantially in the manner and for the purpose herein set forth.

54,794.—Portable Fence.—John Thompson, Williamsburgh, N. Y.:

I claim the swivel pickets, B, and rails, C D E, in combination with the slotted eyes, G, and hooks, H, so arranged that the fence will be conformed to any irregularities of the surface, and the posts always retained perpendicular in position, substantially in the manner herein represented and described.

54,795.—Hot-Air Furnace.—Thomas Wallace, Chicago, Ill.:

I claim the arrangement of the zig-zag pipe, A, and horizontal plates or partitions, B, in a furnace, in such a manner that the heat from the fire in the furnace shall be made to follow the pipe, substantially as and for the purpose set forth.

54,796.—Gate.—H. M. Ward, Stone Church, N. Y.:

I claim the self-acting joint made up of the skeid, D, and bearing, E, connected by the threads, d g, and the guide, f, with two or more friction rollers, h h, when used in combination with the gate, A, in such a manner as to balance it when slid half back and then swing it around automatically, substantially as set forth.

54,797.—Cherry Stoner.—William Weaver, Phœnixville, Pa.:

First, I claim the disk, c, having ribs on both sides, in combination with a double or with two hoppers arranged at opposite sides of the disk, substantially as and for the purpose described.

Second, The combination with the disk, c, of one or more inclined channels, d, for the purpose specified.

Third, The combination with the disk, c, of one or more hoppers with a revolving disk having blunt-edged projections or ribs, c, on one side and sharpened ribs, c', on the other, for the purposes set forth.

54,798.—Boiler Feeder.—W. S. Wells and S. B. Wells, Middlebury, N. Y.:

We claim the combination with a steam boiler of an auxiliary steam and water chamber, provided with a float so constructed with the valve through which steam is supplied to the feed pump, as to cause the starting up and stopping of the said pump, when the several parts are arranged as herein described.

54,799.—Fan and Parasol.—William H. White, West River, Md.:

First, As a new article of manufacture, a fan, sun shade, or canopy, composed of a hooped frame and wrapper, when the latter is provided with draw cases, and draw springs, and constructed and applied in the manner hereinfore set forth.

Second, I claim, as a new article of manufacture, a combination fan and sun shade, constructed and operating substantially in the manner set forth.

54,800.—Corn Plow.—Daniel Wilde, Washington, Iowa.:

First, I claim adjusting the shovel stikes and shovees, by means of the slots, q, and bars, r, as and for the purposes herein recited.

Second, I claim, in combination with the shackle bar, t, between the handles and connected thereto, the slotted or space plated front ends of the beams, m, affixed to the front bar, u, substantially as described, as and for the purposes herein set forth.

Third, I claim connecting the seeder to the plow frame, by means of the hinged straps, x, and bar, z', and pin y, as described.

54,801.—Propeller.—Aretus A. Wilder and William Gooding, Detroit, Mich.:

I claim the combination of said double flanged buckets with paddles, crank shaft and radial arms, constructed substantially as shown and described, and for the purpose set forth.

54,802.—Whitewashing Apparatus.—Moses H. Wiley, Bucksport, Me.:

I claim as my invention the said apparatus or combination of the reservoir, A, the rollers, b, and d, and the towel, e, arranged substantially in the manner and so as to operate as and for the purpose or objects hereintofore specified.

54,803.—Buckle.—Joseph J. Wilkins, Virdey, Ill.:

First, I claim the buckle constructed and operating substantially as shown and described.

Second, I claim providing the buckle tongue with the cam, n, for the purpose of rendering itself-operating, as set forth.

54,804.—Adjustable Sandal.—Jane Maria Wilkinson, Urbana, Ill.:

First, The plate, B, in combination with the heel, A, of the sandal, substantially as and for purposes set forth.

Second, An adjusting device by which a sandal may be adapted to different sizes of shoes, substantially as and for the purposes set forth.

Third, The slide, D, with the opening, E, in combination with the adjustable heel, A, and plate, B, substantially as and for the purposes set forth.

54,805.—Floor Clamp.—Seth C. and Samuel Winslow, Worcester, Mass.:

We claim the combination of the dogs, G G, with the floor clamps, substantially as and for the purpose herein specified.

54,806.—Billiard Register.—A. Wirsching and William Zoehe, Williamsburgh, N. Y.:

First, We claim the use in a billiard indicator, of concave keys or buttons, C C', substantially such as herein described, so that the points of the cues are not liable to slip thereon, when the players wish to force the game in.

Second, The keys, c c', in combination with rockers, m, levers, h, and stop pins, i, substantially as and for the purposes set forth.

Third, The keys, c c', in combination with elbow levers, q r q' r', racks, w w', and index hands, a a', constructed and operating substantially as and for the purpose described.

Fourth, The serrated arms, i2 i3, in combination with stops, i, keys, C C', racks, w w', and index hands, a a', constructed and operating substantially as and for the purpose set forth.

Fifth, The rack, w w', and pinions, e2 e3, in combination with the radiating plates, f2 f3, arms, c2 c3, pawls, b2 b3, ratchet wheels, a2 a3, and index hands, a a', constructed and operating substantially as and for the purpose described.

Sixth, The levers, m2 m3, and inclined plates, o2 o3, in combination with the stops, k2 k3, lifters, p2 p3, and ratchet wheels, a2 a3, constructed and operating substantially as and for the purpose set forth.

Seventh, The additional hook catches, s2 s3, in combination with the ratchet wheels, a2 a3, and index hands, a a', constructed and operating substantially as and for the purpose described.

Eighth, The pawls, a4 a5, and ratchet wheels, w2 w3, in combination with the ratchet wheels, a2 a3, and with the index hands, a a' and b b', as and for the purpose set forth.

Ninth, The inclined planes, e4 e5 f4 f5, in combination with the pawls, a4 a5, and index hands, a a' b b', constructed and operating substantially as and for the purpose described.

Tenth, The keys, c* c* in combination with the ratchet wheels, a2 a3, and index hands, a a', constructed and operating substantially as and for the purpose set forth.

54,807.—Slinging Arm.—Oliver E. Wood, Philadelphia, Pa.:

First, I claim slinging the gun by means of the strap, C', and one or more hooks, D D', substantially as and for the purpose described.

Second, I claim a hook, O, attached to the cartridge box, P, to adapt the latter to be attached to and supported by any part of the equipage.

Third, I claim the method of holding open the flap of the cartridge box.

Fourth, I claim providing the bayonet with a hook, R2, to enable it to be slung to the equipage, as and for the purpose specified.

Fifth, I claim slinging the cartridge box behind to the knapsack, in any manner, substantially as described.

Sixth, I claim the blind buckles, I I, or their equivalents, attached to the front of the knapsack to enable the blankets or other equipage to be retained by the coat straps, G' G', in a position forward of the center of the knapsack, in the manner and for the purpose set forth.

Seventh, I claim the ring, K2, attached to the underside of the knapsack, to support the accoutrements when shifted to the rear.

54,808.—Foot Stove.—M. B. Wright, West Meriden, Conn.:

I claim the arrangement of the movable perforated plate, G, rim, B, lamp, C, movable hanging plate, H, and movable grate, S, in combination with the perforated vessel, A, constructed and operating in the manner and for the purpose herein described.

54,809.—Machine for Coiling Hoops of Wood.—Louis Zistel, Sandusky, Ohio:

First, I claim the combination of the belt, I, pulley, J, self-adjusting pulleys, M and U, carrying pulley, T, drum, K, weighted lever, N, relatively to each other, and operating in the manner and for the purpose herein specified.

Second, The combination of the swinging cover, W, drum, K, pushing hook, E', shaft, D', arms, B' C', arranged and operating in the manner and for the purpose herein specified.

[The object of this invention is to furnish a machine for coiling hoops, grape and cheese-box sides, etc., for market. And it consists of a combination of pulleys, bands and levers, by means of which the hoops are rolled into a coil about a drum or pulley, the parts being so arranged as to adapt themselves automatically to the different positions required by the increasing size of the coil.]

54,810.—Machine for Tightening and Securing the Hoops of Compressed Bales.—Richard S. Adams (assignor to himself and George E. Parrott), Loyd, N. Y.:

I claim an improved machine formed by combining a pair of gripes, B, constructed as described, with each other, with the cog wheel, C, ratchet wheel, E, pawl, F, and with the frame, A, in which they are placed.

Second, The combination of the punch, G, constructed and operated substantially as described, with the machine, for the purposes set forth.

[The object of this invention is to furnish a machine by means of which the hoops may be drawn tightly around the bales and their ends secured to each other easily, securely, and cheaply. And it consists of a pair of gripes, racks, cog wheel and punch, so arranged that the ends of the hoop may be grasped by the gripes and drawn so as to overlap each other. The punch is then operated, cutting, and forcing out a strip in the hoops, so as to form a loop, into which a key is dropped, securely connecting the ends of the hoop together.]

54,811.—Clamp for Holding Cigars for Tying.—Matt All (assignor to himself and William Mayer), Philadelphia, Pa.:

I claim the within described clamp, composed of the elastic band, B, and block, A, constructed substantially as and for the purpose herein set forth.

54,812.—Knitting Machine.—J. M. Armour, Craftsburg, Vt, assignor to National Knitting Machine Co.:

I claim forming a stitch or loop by drawing the needle and thread through an opening in the end of the frame, d, which supports the needle and stitch holder, substantially as described.

Second, The stitch holder, d, arranged to press the stitch against the face of the frame, d, and hold it there, while the needle with the new stitch is drawn into it, substantially as and for the purpose set forth.

Third, The carrier frame, d, constructed and operating as and for the purpose herein shown and described.

Fourth, I claim with drawing the needle, a, by means of the spring, i, or its equivalent for the purpose of imparting to the needle a quick backward movement, and thereby ensuring the drawing of the new stitch through the previously formed stitch before the latter is released by the stitch holder, d, as described.

Fifth, I claim providing the frame, d, within which the needles traverse with hooks and eyes, e e, for the purpose of uniting more or less of them together, as and for the purpose set forth.

Sixth, The combination and arrangement of the cam E, and the cams, o and n, with the needle, a, and stitch holder, d, for the purpose of giving to said needle and stitch holder the required movement, substantially as herein set forth.

Seventh, I claim constructing the form or endless chain for holding the needles of lags or sections, so arranged or connected together as to prevent of enlarging or contracting the form or chain by adding more sections, or removing some of them at pleasure.

Eighth, I claim also the combination of a revolving endless chain or form, constructed as above described with one or more stationary cams for operating the needles.

54,813.—Saw Grinding Machine.—John G. Baker (assignor to Henry Disston), Philadelphia, Pa.:

First, I claim as my invention, the vertically adjustable frame, D, for holding the saw in combination with the grind stones, B and B', the whole being arranged and operating substantially as set forth for the purpose specified.

Second, The frame, D, its detachable packing pieces, e e, and detachable strips, f, the whole being arranged for supporting and grinding the saw blade, substantially as described for the purpose specified.

Third, The combination of the adjustable frame, D, with the adjustable cross head, I, its spindles, J, and the friction pulleys, m.

54,814.—Heating Stove.—Albert N. Beach, Windsted, Conn., assignor to himself and Edward Hatch, Charlestown, Mass.:

I claim my improved stove as constructed with the fuel supply opening, E, furnished with a door or cover, F, and the draft or air inductor inducts, provided with a valve or valves, a, arranged in the top of the stove and over the fuel chamber in the manner and for purpose set forth.

54,815.—Self-rocking Cradle.—Benjamin Brazelle (assignor to himself, W. P. Walker and J. Clark Brown), Nashville, Ill.:

I claim the rocker wheel, K, the sliding verge, N, the lever, L, the decent or lock lever, P, the stud, O, and the hinged foot, M, in combination with each other with the clock work, and with the frame of the cradle or crib, substantially as herein described and for the purpose set forth.

[This invention consists in combining with the frame of the cradle of a system of levers and clock work, so constructed and arranged as to impart to the cradle a constant and regular vibration, and which can be so adjusted that the motion may be slow or fast, and the movement long or short, as may be desired.]

54,816.—Feeding Mechanism for Sewing Machines.—George W. Goodspeed, Winchendon, Mass., assignor to T. S. Page, Toledo, Ohio:

I claim the arrangement and combination of the cams, f g, the feeder, F, its arms, b c, the regulating screw, d, and the vibratary arm, h.

And also the combination of the same and the friction apparatus, substantially as herein before described.

54,817.—Dinner Pail.—David Howarth (assignor to himself, W. R. Johnson, and Samuel C. Rundlett), Portland, Me.:

I claim a dinner pail composed of several rings so arranged that they may be passed out when the pail is to be used, the rings connected with each other, when so pressed out, by forming hooks or shoulders on their edges to overlap each other and the lower or bottom ring having a compartment to contain liquid, all constructed and arranged in the manner and for the purposes herein set forth.

54,818.—Device for Operating Sashes of Ventilating Windows.—Edwin Lockwood, Bordentown, N. J., assignor to himself and to Wm. H. Carryl, Philadelphia, Pa.:

I claim the combination of the rod A, lever, D, spring, L, pawl, M, and ratchet or corrugated plate, B, in the manner and for the purpose substantially as shown and described.

54,819.—Clothes Sprinkler.—Matthew Moriarty, Bangor, Me., assignor to himself and William A. Ulmer, Ellsworth Falls, Me.:

I claim as my invention and as a new article of manufacture for the special purpose for which it is designed, the clothes sprinkler composed of the elastic bulb, the jet pipe and the nose arranged arranged and combined, substantially as specified.

54,820.—Pipe Tongs.—Albert E. Page (assignor to Page, Wilson & Co.), Fitchburg, Mass.:

I claim the arrangement of the arm, B, with respect to the arm, B', of the lever, B B' in the manner substantially as described, and the application of the jaw, D, to such arm, B, by a screw, b, projecting from the jaw and screwed through the said arm in the manner and so that it may be revolved with and by means of the jaw, substantially as specified.

I also claim when the jaw, D, of the pipe tongs is connected to its screw, b, so as to operate with it, the arrangement of one of the two teeth of the jaw in and the other aside from the axis of the screw produced, the whole being as explained.

54,821.—Machine for Boarding and Graining Leather.—James Parker, Woburn, Mass., assignor to himself, S. and S. B. and L. L. Holden:

I claim, First, The combination in a boarding machine of the top board, G, with the arm, F, and slide, C D, substantially as described and for the purpose set forth.

Second, The combination of the top board, G, with the springs, K, and rubber board, H, substantially as described and for the purpose set forth.

Third, The combination of the rubber board, H, and bolster board, I, substantially as described and for the purpose set forth.

Fourth, The combination of the bolster board, I, with the springs, S, and trencher board, N, substantially as described and for the purpose set forth.

Fifth, The combination of the trencher board, N, with the springs, S, screws, M, and board or frame, I, substantially as described and for the purpose set forth.

Sixth, The combination of the arm, V, and lever, T, with the trencher board, N, and bolster board, I, substantially as described and for the purpose set forth.

[The object of this invention is to furnish a machine by which leather of different variety and of different thicknesses may be boarded, grained, or softened quickly and thoroughly. And it consists principally in the combination of a rubber and bolster with each other, both rubber and bolster being adjustable and so constructed and arranged, as to adapt themselves to the various thicknesses of the skin that may be operated upon.]

54,822.—Grain Elevator.—Joseph T. Parlour (assignor to himself and James Dean), Buffalo, N. Y.:

I claim the adjustable hinged screw clamps, P, when used for the purpose of holding the endless bucket chain, constructed and arranged as herein described.

[This invention relates to a new arrangement of parts especially intended to be used on vessels, in which grain is transported, the object of which is to automatically convey or shovel the grain from all parts of the hold, to the hatching in which the elevator is arranged for hoisting and thus discharging the grain from the vessel.]

54,823.—Ditching Machine.—Jacob P. Rees and R. A. Graham (assignor to themselves and C. C. Burns), Greensburg, Ind.:

I claim the cutting wheel, F, or its equivalent, arranged in a suitable frame so hung in and to the body of the machine, as to be raised or lowered, substantially in the manner described and for the purpose specified.

[The principal object of this invention is to construct or arrange the ditching device of the machine, in such a manner that a ditch of any desired depth may be made.]

54,824.—Steering Apparatus.—Edward A. Turner, New York City, assignor to himself and John A. Leggett, Branford, Conn.:

First, I claim the pawls, n r, and the frames, K, arranged and operating with reference to each other and with the two ratchet wheels, g h, on the drum of the apparatus, substantially as herein set forth for the purpose specified.

Second, The levers, s, provided with treadles, u, or their equivalents, operating the pawls, n r, in connection with the ratchet wheels, g h, substantially as herein before set forth for the purpose specified.

54,825.—Tool for Making Spiles.—G. W. Wait (assignor to himself and A. J. Smith), Wayland, Mich.:

I claim the combination of the shaping knife, B, with a wood boring tool, A, in such a manner as to bore and shape wooden spiles at one operation, substantially as specified.

[This invention consists in the combination with a bit or any suitable boring tool, of a knife or cutter so constructed and arranged that while the tool is boring the hole in the spile, the knife will bend or round off the end in the manner required.]

54,826.—Mold for Casting Curved Pipe. Seth Williams, (assignor to Henry C. and C. T. Williams), Foxboro, Mass.:

I claim the arrangement and combination of the wings or extensions of the core stock, with the two openings, or the same, and the brackets applied to the two parts of the flask, substantially as specified.

54,827.—Saw.—Joseph Woodrough, Hamilton, Ohio, assignor to Woodrough & McParlin, Cincinnati, Ohio:

I claim the counter sunk or imbedded gibs, E, employed in combination with the teeth, B C', substantially as and for the purpose set forth.

54,828.—Seat and Back to Chairs.—Francois Carre, Paris, France:

First, I claim the radiating strips, a, of sheet steel, or other suitable material, in combination with the central disk, b, and frame, c, constructed and operating substantially as and for the purpose described.

Second, The secondary supporting strips, e, in combination with the radiating strips, a, and central disk, b, constructed and operating substantially as and for the purpose set forth.

Third, The back of a chair or other similar article composed of C-shaped strips, a', of sheet metal or other suitable material, in combination with horizontal rods, h', and frame, h, constructed and operating substantially as and for the purpose described.

54,829.—Mode of Separating Gold and Silver from their Ores.—William Crookes, London, England:

I claim the employment of zinc, tin, and cadmium, and such other metals as here in before mentioned, and also of such several processes for the extraction of gold and silver from the ores and substances containing them, and for the treatment of mercury, employed for such purposes as herein before substantially set forth and described.

54,830.—Ventilating Stove for Railroad Cars.—Richard Eaton, London, England:

First, I claim the arrangement of the air ducts, F, in the front corner of the stove and air passage, D, in the top thereof, in combination with the air pipe, C, in the manner and for the purpose herein specified.

Second, The arrangement of the chamber, A, air ducts, F, air passage, D, air pipe, C, spiral chamber, G, and chimney, B, constructed and operating in the manner and for the purpose herein specified.

[The object of this improvement is to produce a stove which shall give out a large amount of heat with a small amount of fuel in comparison with other stoves; which also can be used with coal, wood, or other fuel; and which will, when in operation, serve to ventilate the apartment or car in which it is used.]

54,831.—Watch.—F. A. Lange, Glashutte, Saxony:

First, I claim the removable key, E, inserted within the pendant of a watch and retained therein, substantially in the manner described in combination with the winding mechanism of the watch, when constructed and operating in the manner and for the purposes as set forth.

Second, I claim the concave contrate wheel, F, upon the arbor, D, and gearing with the crown wheel, z, said contrate wheel having its teeth constructed in the peculiar manner described.

Third, I claim providing the ratchet cylinder H, upon the arbor, D, and gearing with the contrate wheel, F, with a projection, M, upon its lower surface, which enters a slot or recess upon the face of the pinion, O, and operates in the manner and for the purposes set forth.

Fourth, I claim the loose pinion, O, upon the shaft, D, in connection with the minute wheel when provided with a recess, N, upon its face, and constructed and operating in the manner and for the purpose set forth.

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Fifth, I claim the combination of the removable key, B, arbor, D, concave, contrate, wheel, F, crown wheel, Z, ratchet cylinder, H, with its spring, K, and the pinion, O, when constructed and operating substantially in the manner and for the purpose set forth.

54,832.—Artificial Fuel.—Edmund Sharpe, Paris, France:

I claim the herein-described artificial fuel consisting of peat, anthracite, and bituminous coal with a coal-tar cement, combined in the proportion and in the manner substantially as set forth.

54,833.—Method of Mining Coal Minerals, Etc.—William Locke, John Warrington, W. E. Carrett, W. E. Marshal, and J. Telford, Kippax, Eng..

First, We claim the system or mode of actuating the cutting tool or tools of machines for working coal and other minerals and earthly matter by the direct pressure of a flow of water or other practically non-elastic fluid medium, by the means and in the manner substantially as herein shown and set forth, so as to produce a steady even slotting action of the tool or tools at any angle with the substance to be cut.

Second, The application and use to and in machines for working coal and other minerals and earthly matters of a holding on head or feeler, which is pressed against the roof during the cutting action of the tool or tools and released therefrom to allow the machine to move forward during the return or back stroke of the tool or tools, the movements of this head or feeler being obtained from the pressure of water or other practically non-compressible fluid medium, substantially as herein shown and described.

53,834.—Manufacturing Bank Notes.—George T. Jones, Cincinnati, Ohio:

I claim the process substantially as herein described of manufacturing bank notes, bonds or analogous securities, by applying ink or coloring matter to unsized or partially sized paper, so that it will penetrate or come into actual contact with the fiber thereof, and afterward applying a coating of size to permeate the paper, cement its fibers and prevent counterfeiting or alteration by the transfer or removal of the ink.

I claim as a new article of manufacture, a bank note bond or other evidence of value with the portion or signature protected by size for the purpose of preventing counterfeiting or alteration.

54,835.—Mode of Preparing Bank Notes to Prevent Counterfeiting.—Geo. T. Jones, Cincinnati, Ohio:

I claim covering the impression with a transparent film of paper or other fibrous material, substantially as described.

REISSUES.

2,241.—Water Closet Valve.—T. H. Bartholomew, New York City. Patented Jan. 19, 1864:

First, I claim in combination with a water closet, a supply valve, valve stem, diaphragm, E, and regulating chamber, said parts being so arranged that the valve may be opened by the manual force applied to it, and closed by the pressure of the water and retarded in its closing, substantially in the manner as and for the purpose set forth.

Second, A flexible disk forming an obstruction in the water passage or way of the cock, to operate in the manner substantially as and for the purpose set forth.

2,242.—Preserve Jar.—R. A. Bunnel (assignee of Chas. F. Spencer), Rochester, N. Y. Patented Feb. 10, 1863:

I claim a cover or stopper, with a packing around its edge, or peripphery, in combination with a jar, or can, whose mouth or neck has a cylindrical or slightly flaring inner surface, and an inwardly projecting shoulder or seat below.

I also claim a self-retained cover, or stopper with a packing which projects above and below its edge so as to be impressed between the rime and the mouth, or neck of the jar or can.

I also claim the combination of a jar, or can which has no inwardly projecting shoulder in the mouth or neck thereof, with a cover or stopper, whose packing packs both against the said shoulder, and against the inner periphery of the neck.

I also claim a packing ring, one edge of which is bent inward and held in a peripherial groove of the stopper or cover.

I also claim a cover, or stopper, which has an edge or flange below the packing nearly fitting within and in combination with a shoulder in the neck of the jar or can.

I also claim the combined arrangement and construction of the double flanged cover, B, packing, b, and jar-neck seat, a, one flange, f, of the cover compressing and tightening the packing ring and the other flange, g, nearly fitting and closing the circle within the seat, substantially as and for the purposes herein specified.

2,243.—Iron Ship.—Mary Jane Montgomery (assignee by mesne assignments of Richard Montgomery), New York City. Patented Dec. 6, 1859:

First, I claim the use of corrugated metallic beam, whether straight, curved, bent, or sheared, in the construction of ships, steamers, or other vessels.

Second, The use of corrugated metallic plates or sheets, in the construction of bulk heads or partitions for forming fire-proof or water proof compartments in the holds of ships, steamers and other vessels.

Third, The block or knee, C, when constructed substantially in the manner and for the purpose set forth.

Fourth, The metallic plate, E, when forming the plating of the sides, and if required, the flooring of the deck, in combination with the corrugated beams to which they are attached, substantially as shown and described.

2,244.—Iron Ship.—Mary Jane Montgomery (assignee by mesne assignments of Richard Montgomery), New York City. Patented Dec. 6, 1859:

I claim the above described curved, bent, or sheated corrugated beam, irrespective of any peculiar curve, bend, or shear, in the construction of ships or other vessels.

2,245.—Sewing Machine for Stitching Button Holes.—The Bartram & Fenton Manufacturing Company, Danbury, Conn., assignees by mesne assignments of W. B. Bartram, Reading, Conn. Patented Nov. 7, 1865:

First, We claim stitching a bar across the end of a button hole, for the purpose of strengthening the same, by means of devices which produce a lateral reciprocation of the material being stitched while it is also being fed forward, and permit the extent of the said lateral reciprocation to be increased at will by hand, while the machine continues in operation.

Second, Working and entirely completing a button hole without the use of a hand needle, by means of devices substantially as herein described.

Third, In combination with the arm, H, the wheel, I, and the eccentric of the driving shaft of a sewing machine or its equivalents, for the purpose set forth.

Fourth, In combination with the wheels, I, and P, the arm, H, and the stop, J, provided with the projection, a, substantially as and for the purpose set forth.

Fifth, In combination with the wheel, I, the stop, J, and the plate, A, substantially as and for the purpose set forth.

Sixth, In combination with the movable plate, A, of a sewing machine, the cloth holder, O, and the circular plate, N, as and for the purpose set forth.

Seventh, In combination with the cloth holder, O, the stationary guide, P, and circular plate, N, substantially as and for the purpose set forth.

Eighth, In combination with the springs, L, the stop, J, wheels, I P, arm, H, and the eccentric of the driving shaft of a sewing machine, substantially as described for the purpose of producing a zig-zag stitch.

Ninth, In combination with the feed bar, b, and its eccentric regulating lever, R, for throwing the feed bar entirely out of action, substantially as and for the purpose herein set forth.

2,246.—Mode of Regulating the Temperature of Hot Water Apparatus.—Thomas T. Tasker, Philadelphia, Pa. Patented Dec. 5. 1854:

First, I claim the combination of a float actuated by the expansion of water with a draft or smoke damper, as the means of regulating the temperature of a hot water heating apparatus, substantially as and for the purposes described.

Second, The use of the damper, O, for admitting cold air over the fire, as a means of cooling the gases of combustion, of reducing the draft, and of cooling the water in the boiler, either alone or in combination with other dampers.

Third, The use of a simultaneous motion for the dampers, P and M, and the succeeding simultaneous motion for the dampers, P and O, as described.

Fourth, The combination of the three dampers, P O M, and the float, A, together with rods, G K, and the link, R H, for the purpose and object herein described.

2,247.—Machine for Sawing and Edging Clapboads.—Avetus A. Wilder, Detroit, Mich. Patented, Oct, 30, 1855. Reissued, Oct. 18, 1859.

First, I claim the flanged rollers, d, with the spring, e, or equivalents, in combination with the adjustable back rest, b, for the purpose herein before described.

Second, The combination of circular saw, k, and the rotary edging cutter, n, attached to its arbor with the upper rotary edging cutter, g, for the purpose herein described.

DESIGNS.

2,312.—Bracket.—Albert Bridges, New York City.

2,313.—Card Holder.—Joshua Brooks, Newton, Mass.

2,314.—Plates of a Cook Stove.—Samuel W. Gibbs (assignor to Samuel H. Ransom), Albany, N. Y.

2,315.—Plates of a Cook Stove.—Samuel W. Gibbs (assignor to Samuel H. Ransom), Albany, N. Y.

2,316.—Printer's Type.—Andrew Little, New York City.

2,317.—Knife Handle.—Solomon Oppenheimer, Peru, Ind.

2,318.—Plates of a Cook Stove.—Samuel H. Ransom, Albany, N. Y.

2,319.—Plates of a Cook Stove.—Samuel H. Ransom, Albany, N. Y.

2,320.—Plates of a Cook Stove.—Samuel H. Ransom, Albany, N. Y.

2,321.—Plates of a Parlor Stove.—Samuel H. Ransom, Albany, N. Y.

2,322.—Plates of a Parlor Stove.—SamuelH. Ransom, Albany, N. Y.

Notes and Queries

C. H. L., of R. I.—Your question about firing the cannon ball from a train of cars is an old one and has been published even in the daily papers some time since. We do not care to publish problems of this nature.

C. B. S., of Ind.—The points of drawing instruments, or rather the legs, are screwed on to the brass or German silver.

J. E. B., of Mass.—You ask us when there is the most strain upon a rope—when but one pair of oxen is drawing on it attached to a stump, or when there are two pair of oxen, one pulling one way and the other another. We ask you whether there is more strain on a rope with two thousand or with four thousand pounds?

O. Z. D., and others.—We must positively decline publishing recipes that have appeared within a week or two in our paper. It seems as though some of our friends read the paper very superficially.

Y. C. J., of Pa.—Paper rubbed with lampblack will make a tracing paper for common purposes.

C. E. W., of Mass.—It is impossible for us to say what will cure the itch.

W. R. B., of N. Y.—There is nothing in the diagram you send us "to turn a crank through more than one-half of its stroke by a single movement of a lever." If you have obtained such a result, it is due to the momentum of some of the parts, not to any arrangement of them.

T. L. B., of St. Louis.—You have hit the nail on the head.

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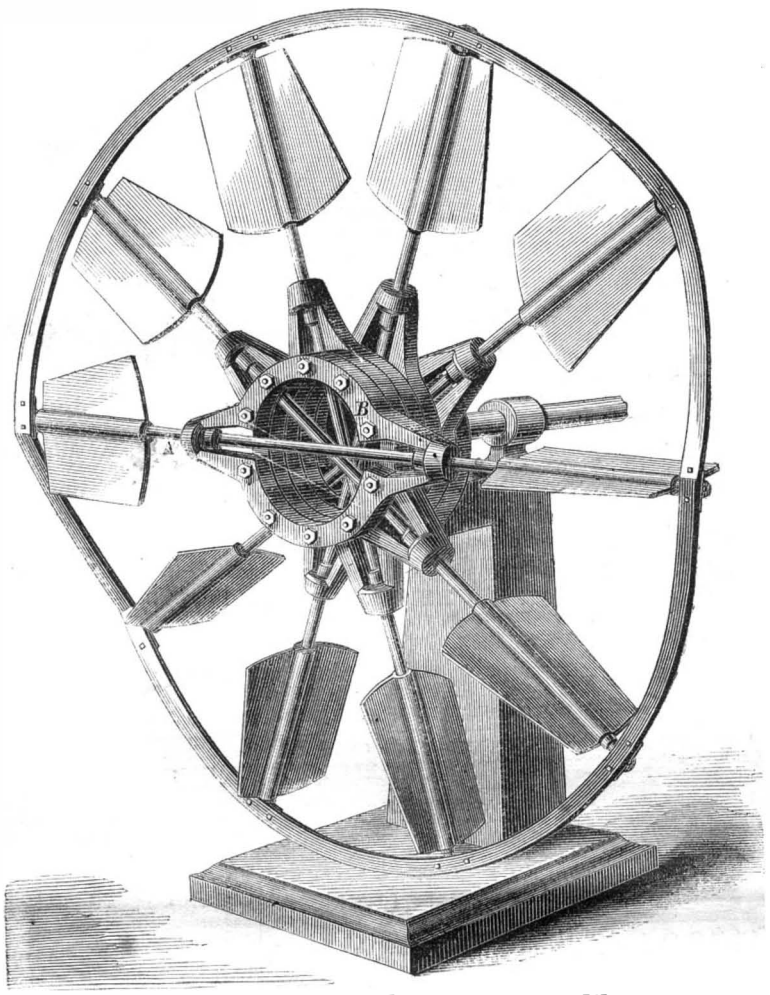
Improved Self-feathering Paddle Wheel.

The engraving published herewith shows a new paddle wheel which is designed to avoid the objection which attaches to the common wheel. It is intended that the paddles or buckets shall enter and leave the water very nearly the same as a paddle would held in the hand and turned at the end of the stroke. In detail the buckets are affixed to rods or shafts, A, passing through central bearings, B. These bearings are screwed to each other and fastened to the main shaft of the engine.



KEENE'S SELF-FEATHERING PADDLE WHEEL.

The buckets are not parallel to each other, but are arranged at right angles, so that as they emerge from the water edgewise they will present the bucket, which is just entering, in the most favorable position for propelling the boat. The upper part of the wheel, that which is not immersed, has the buckets edgewise or nearly so, thus avoiding the atmospheric resistance that is incident to the common wheel. The engraving shows the paddles disposed in a regular order at the bottom the same as any other. This is not the true position when at work, as the paddles assume all angles according to their position, in passing through the water, but owing to the impossibility of fixing these angles definitely in the model, and the confused appearance the wheel would have so drawn, we have depicted it as shown. It will be seen that the feathering action is obtained by the shape of the paddle, one side being wider than the other. The greater area will therefore act against the less, turning the paddle as before stated.

Patented on Jan. 10, 1865, by G. A. Keene, Newburyport, Mass. A company with a capital has been formed for the purpose of introducing this invention, and for further information the reader is referred to Charles C. Dame, President, No. 10 Barrister's Hall, Court Square, Boston, Mass.

Improved Roofing.

It is well known that for general purposes shingle roofs are the cheapest and most durable. They are quickly put on and easily repaired when leaky. One trouble with them, however, is, that they retain moisture for some time after rain storms, and therefore rot much more quickly than they would otherwise.

The roof here shown is composed of shingles on a new plan. Instead of having plain surfaces, fitting closely one to the other, the several shingles are ribbed, as shown, so that one laps over on the other.

A series of channels are thus formed underneath, which allows free ventilation or circulation, so that the humidity which causes rot and mildew is speedily dissipated.

It is claimed by the inventor that this roof will last three times us long as an ordinary shingle roof, while the expense of so forming them will not exceed thirty cents per thousand over common shingles.

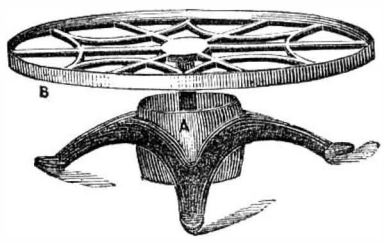
THE BURLINGTON SHINGLE ROOFING.

Patented Jan. 9, 1866. For further information address John F. Lowden, Burlington, N. J., or Smith Brothers, 139 Broadway, New York.

Artificial Wants.—Bulwer says that poverty is only an idea in nine cases out of ten. Some men with ten thousand dollars a year suffer more for the want of means than others with three hundred. The reason is the richer man has artificial wants. His income is ten thousand, and he suffers enough from being dunned for unpaid debts to kill a sensitive man. A man who earns a dollar a day, and does not run in debt, is the happier of the two. Very few people who have been rich will believe this, but it is as true as God's word. There are thousands with princely incomes who never know a moment of peace, because they live above their means. There is really more happiness among the working people than among those who are called rich.

LAMB'S DISH-STAND.

The season approaches when mice, flies, ants, and the plague of small lice, afflict the housekeeper. Dishes set aside for tea are covered with undesirable guests, and great is the vexation and loss thereby. It is well known that ants, beetles, and other creeping things, have an aversion for water. They will not touch it when they can avoid it, and many persons rid themselves of these pests by setting their dishes on supports which are immersed in water. As it is inconvenient to be continually improvising arrangements of this kind, an inventor has constructed a stand which has a cup formed at the base in which water is poured, thus completely surrounding the central stand and converting it into an invulnerable fortress. A is the cup and B the stand.



Besides this the utensil is handy for other purposes—for holding a flatiron or a coffee pot that has been on the stove and is liable to black the cloth, etc. They are made of cast iron, neatly japanned, and weigh about a pound; larger sizes are made for holding heavier articles.

It was patented Feb. 13, 1866, by I. W. Lamb. For further information address J. E. Johns, General Agent, Box 972, Rochester, N. Y., town, county and State rights for sale.

English statesmen are becoming alarmed about the probable exhaustion of her coal fields; no coal, no steam. Chancellor Gladstone admits that the United States has about forty times more coal than England.

We are indebted to Hon. E. D. Morgan, Hon. James Guthrie and Hon. E. C. Ingersoll for valuable public documents.

MECHANICS

INVENTORS, MANUFACTURERS

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